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GRADE 3

Volume 2

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MATH

Expressions

Common Core

Dr. Karen C. Fuson



GRADE

3

Volume 2

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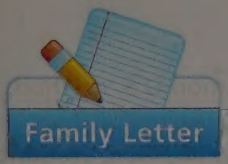
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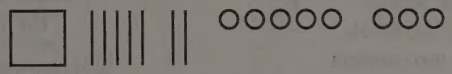


Content Overview

Dear Family,

Your child is currently participating in math activities that help him or her to understand place value, rounding, and addition and subtraction of 3-digit numbers.

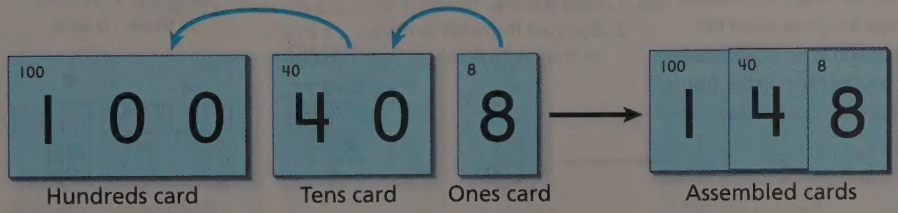
- **Place Value Drawings:** Students learn to represent numbers with drawings that show how many hundreds, tens, and ones are in the numbers. Hundreds are represented by boxes. Tens are represented by vertical line segments, called ten sticks. Ones are represented by small circles. The drawings are also used to help students understand regrouping in addition and subtraction. Here is a place value drawing for the number 178.



1 hundred 7 tens 8 ones

The 7 ten sticks and 8 circles are grouped in 5s so students can see the quantities easily and avoid errors.

- **Secret Code Cards:** Secret Code Cards are a set of cards for hundreds, tens, and ones. Students learn about place value by assembling the cards to show two- and three-digit numbers. Here is how the number 148 would be assembled.



Estimate Sums and Differences Students learn to estimate sums and differences by rounding numbers. They also use estimates to check that their actual answers are reasonable.

	Rounded to the nearest hundred	Rounded to the nearest ten
493	500	490
129	100	130
+ 369	+ 400	+ 370
991	Estimate: 1,000	Estimate: 990

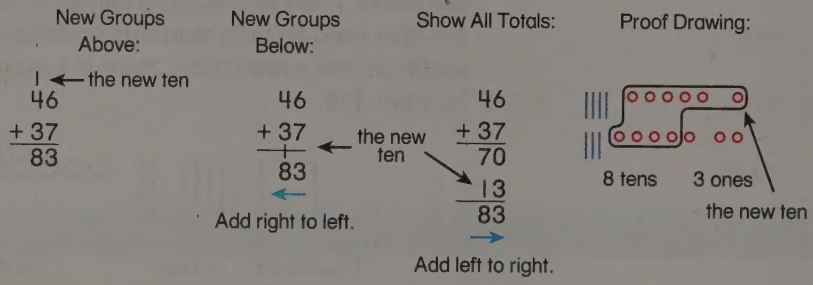
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Family Letter

Content Overview

Addition Methods: Students may use the common U.S. method, referred to as the New Groups Above Method, as well as two alternative methods. In the New Groups Below Method, students add from right to left and write the new ten and new hundred on the line. In the Show All Totals method, students add in either direction, write partial sums and then add the partial sums to get the total. Students also use proof drawings to demonstrate grouping 10 ones to make a new ten and grouping 10 tens to make a new hundred.

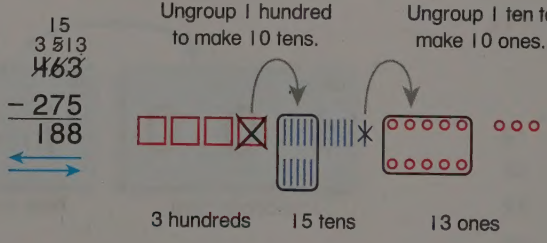
The New Groups Below Method shows the teen number 13 better than does the New Groups Above Method, where the 1 and 3 are separated. Also, addition is easier in New Groups Below, where you add the two numbers you see and just add 1.



Subtraction Methods: Students may use the common U.S. method in which the subtraction is done right to left, with the ungrouping done before each column is subtracted. They also learn an alternative method in which all the ungrouping is done *before* the subtracting. If they do all the ungrouping first, students can subtract either from left to right or from right to left.

The Ungroup First Method helps students avoid the common error of subtracting a smaller top number from a larger bottom number.

1. Ungroup first
2. Subtract (from left to right or from right to left).



Please call if you have any questions or comments.

Thank you.

Sincerely,
Your child's teacher

CA CC

Unit 4 addresses the following standards from the *Common Core State Standards for Mathematics with California Additions:* **3.OA.8, 3.NBT.1, 3.NBT.2,** and all Mathematical Practices.

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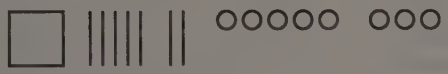
Carta a la familia

Un vistazo general al contenido

Estimada familia:

Su niño está participando en actividades matemáticas que le servirán para comprender el valor posicional, el redondeo y la suma y resta de números de 3 dígitos.

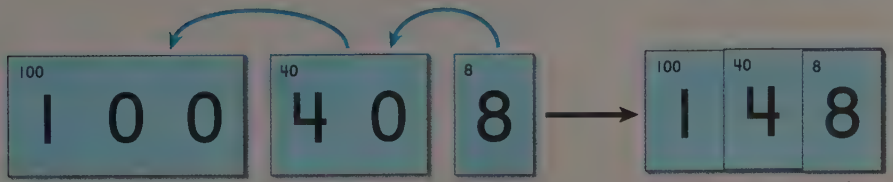
- **Dibujos de valor posicional:** Los estudiantes aprenden a representar números por medio de dibujos que muestran cuántas centenas, decenas y unidades contienen. Las centenas están representadas con casillas, las decenas con segmentos verticales, llamados palitos de decenas, y las unidades con círculos pequeños. Los dibujos también se usan para ayudar a los estudiantes a comprender cómo se reagrupa en la suma y en la resta. Este es un dibujo de valor posicional para el número 178.



1 centena 7 decenas 8 unidades

Los palitos de decenas y los círculos se agrupan en grupos de 5 para que las cantidades se puedan ver más fácilmente y se eviten errores.

- **Tarjetas de código secreto:** Las tarjetas de código secreto son un conjunto de tarjetas con centenas, decenas y unidades. Los estudiantes aprenden acerca del valor posicional organizando las tarjetas de manera que muestren números de dos y de tres dígitos. Así se puede formar el número 148:



Tarjeta de centenas | Tarjeta de decenas | Tarjeta de unidades | Tarjetas organizadas

Estimar sumas y diferencias: Los estudiantes aprenden a estimar sumas y diferencias redondeando números. También usan las estimaciones para comprobar que sus respuestas son razonables.

	Redondear a la centena más próxima	Redondear a la decena más próxima
493	500	490
129	100	130
+ 369	+ 400	+ 370
991	Estimación: 1,000	Estimación: 990

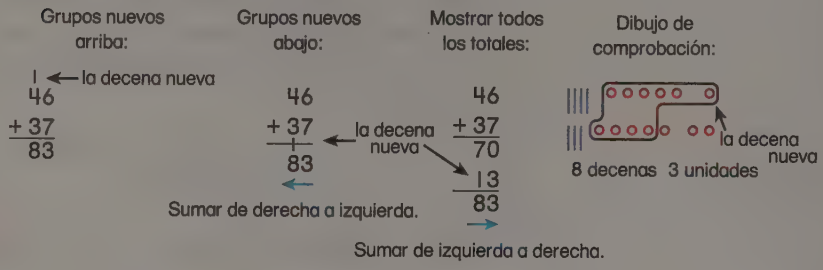
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Carta a la familia

Un vistazo general al contenido

Métodos de suma: Los estudiantes pueden usar el método común de EE. UU., conocido como Grupos nuevos arriba, y otros dos métodos alternativos. En el método de Grupos nuevos abajo, los estudiantes suman de derecha a izquierda y escriben la nueva decena y la nueva centena en el renglón. En el método de Mostrar todos los totales, los estudiantes suman en cualquier dirección, escriben sumas parciales y luego las suman para obtener el total. Los estudiantes también usan dibujos de comprobación para demostrar cómo se agrupan 10 unidades para formar una nueva decena, y 10 decenas para formar una nueva centena.

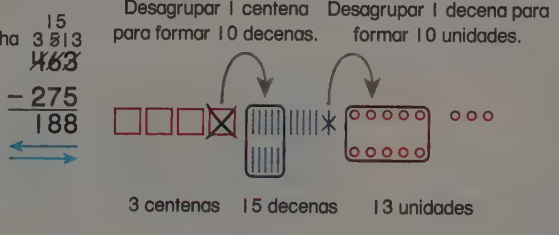
El método de Grupos nuevos abajo muestra el número 13 mejor que el método de Grupos nuevos arriba, en el que se separan los números 1 y 3. Además, es más fácil sumar con Grupos nuevos abajo, donde se suman los dos números que se ven y simplemente se añade 1.



Métodos de resta: Los estudiantes pueden usar el método común de EE. UU., en el cual la resta se hace de derecha a izquierda, desagrupando antes de restar cada columna. También aprenden un método alternativo en el que desagrupan todo *antes* de restar. Si los estudiantes desagrupan todo primero, pueden restar de izquierda a derecha o de derecha a izquierda.

El método de Desagrupar primero ayuda a los estudiantes a evitar el error común de restar un número pequeño de arriba, de un número más grande de abajo.

1. Desagrupar primero.
2. Restar (de izquierda a derecha o de derecha a izquierda).



Si tiene alguna pregunta o algún comentario, por favor comuníquese conmigo. Gracias.

Atentamente,
El maestro de su niño

CA CC

En la Unidad 4 se aplican los siguientes estándares auxiliares, contenidos en los *Estándares estatales comunes de matemáticas con adiciones para California:* **3.OA.8, 3.NBT.1, 3.NBT.2,** y todos los de prácticas matemáticas.

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4-1 Class Activity

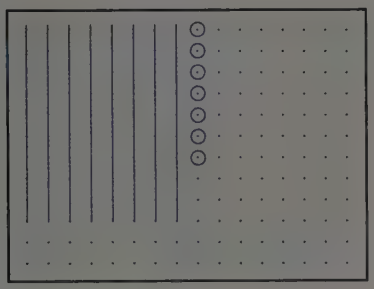
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CA CC Content Standards 3.NBT.1, 3.NBT.2
Mathematical Practices MP.2

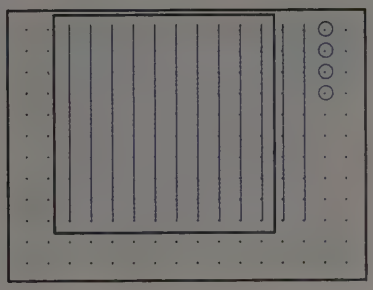
VOCABULARY
place value

▶ Practice Place Value Drawings to 999

Write the number for each dot drawing.

1. 

67

2. 

198

Write the number for each place value drawing.

3. 

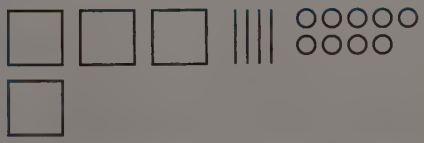
623

4. 

449

5. 

623

6. 

449

Make a place value drawing for each number.

7. 86

8. 587

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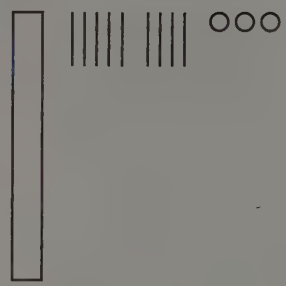
Name _____ Date _____

▶ Practice with the Thousand Model

Write the number for each place value drawing.

9. 

1,232

10. 

1,092

Make a place value drawing for each number.

11. 2,368

12. 5,017

▶ Write Numbers for Word Names

Write the number for the words.

13. eighty-two 82
14. ninety-nine 99
15. four hundred sixty-seven 467
16. nine hundred six 906
17. one thousand, fifteen 1,015
18. eight thousand, one hundred twenty 8,120

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1 2 10 20

1 2 1 0 2 0

3 4 30 40

3 4 3 0 4 0

5 6 50 60

5 6 5 0 6 0

7 8 70 80

7 8 7 0 8 0

9 90 100

9 9 0 1 0 0





200

2 0 0

300

3 0 0

400

4 0 0

500

5 0 0

600

6 0 0

700

7 0 0

800

8 0 0

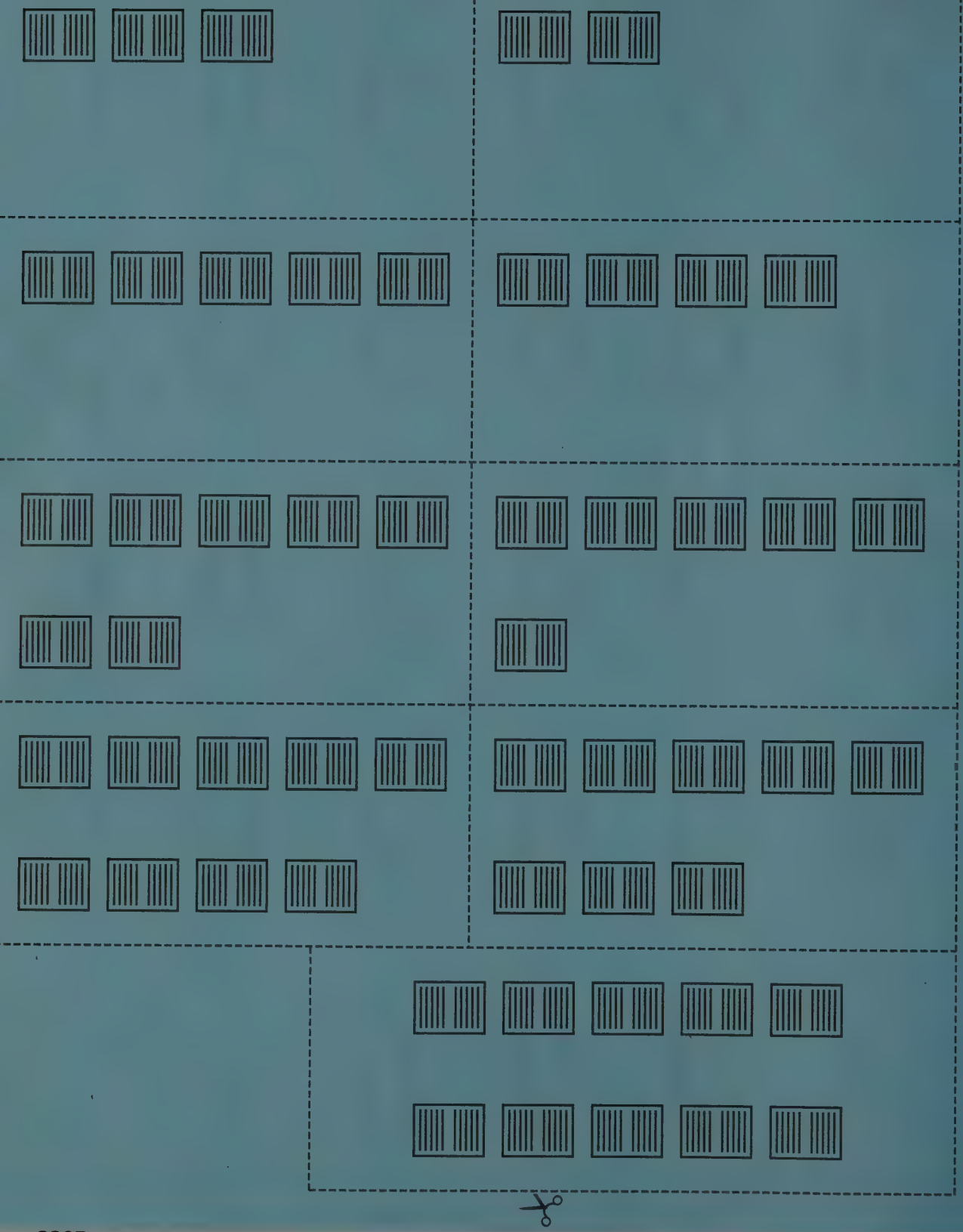
900

9 0 0

1000

1 0 0 0





Secret Code Cards 200–1,000

4-3 Class Activity

Name _____ Date _____

CA CC Content Standards 3.NBT.1, 3.NBT.2
Mathematical Practices MP.1, MP.4, MP.7

VOCABULARY
expanded form
standard form

▶ Read and Write Numbers

Write the number for the words.

1. two hundred twelve 212
2. two thousand, eight 2,008
3. nine hundred ninety-one 991
4. six thousand, fifty-one 6,051
5. four hundred sixteen 416
6. six hundred nine 609
7. nine hundred eighty-seven 987
8. five thousand, thirty 5,030
9. four thousand, seventeen 4,017
10. eight thousand, six hundred 8,600

Write the word name for each number.

11. 783 seven hundred eight + three
12. 907 Nine hundred seven
13. 3,001 Three thousand one
14. 8,043 eight thousand forty three

Write each number in expanded form.

15. 314 3 hundred + 1 tens + 4 ones
16. 2,148 2 thousand + 1 hundred + 4 tens + 8
17. 7,089 _____
18. 8,305 8 thousand + 3 hundred + 5 ones

Write each number in standard form.

19. 5 thousands + 8 tens + 7 ones 5,087
20. 6 thousands + 4 hundreds + 5 ones 6,405

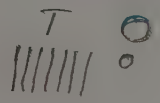
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Name _____ Date _____

Solve and Discuss

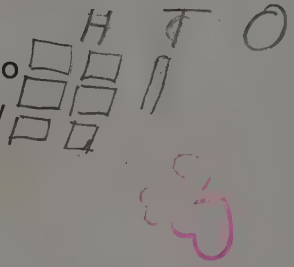
Use a place value drawing to help you solve each problem. Label your answers.

Show your work.



21. Scott baked a batch of rolls. He gave a bag of 10 rolls to each of 7 friends. He kept 1 roll for himself. How many rolls did he bake in all?

71 rolls



22. Sixty-two bags of hot dog buns were delivered to the school cafeteria. Each bag had 10 buns. How many buns were delivered?

620 buns

Mario and Rosa baked 89 corn muffins. They put the muffins in boxes of 10.

23. How many boxes did they fill?

8 boxes

24. How many muffins were left over?

9 muffins

Zoe's scout troop collected 743 cans of food to donate to a shelter. They put the cans in boxes of 10.

25. How many boxes did they fill?

74 boxes

26. How many cans were left over?

3 cans

27. **Math Journal** Write your own place value word problem. Make a drawing to show how to solve your problem.

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4-4 Class Activity

Name _____ Date _____

CA CC Content Standards 3.NBT.1, 3.NBT.2
Mathematical Practices MP.1, MP.7

VOCABULARY
hundreds
tens
ones

▶ Scrambled Place Value Names

Unscramble the place values and write the number.

1. 8 ones + 6 hundreds + 4 tens
 648

2. 9 hundreds + 7 tens + 1 one
 971

3. 5 ones + 0 tens + 7 hundreds
 705

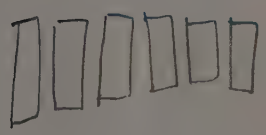
4. 5 tens + 4 ones + 3 hundreds
 354

5. 2 tens + 2 hundreds + 2 ones
 222

6. 8 hundreds + 3 ones + 6 tens
 863

Unscramble the place values and write the number. Then, make a place value drawing for the number.

7. 6 hundreds + 9 ones + 3 tens
 639



8. 9 ones + 3 tens + 8 hundreds
 839

9. 8 ones + 3 hundreds + 4 tens
 348

10. 2 hundreds + 9 tens + 1 one
 219

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Name _____ Date _____

▶ Solve and Discuss

Solve each problem. Label your answer.

11. The bookstore received 35 boxes of books. Each box held 10 books. How many books did the store receive?

350 Book

Maya's family picked 376 apples and put them in baskets. Each basket held 10 apples.

12. How many baskets did they fill?

37 basket

13. How many apples were left over?

7 apple

Aidee had 672 buttons. She put them in bags of 100 buttons each.

14. How many bags did Aidee fill?

15. How many buttons were left over?

When Joseph broke open his piggy bank, there were 543 pennies inside. He grouped the pennies into piles of 100.

16. How many piles of 100 did Joseph make?

17. How many extra pennies did he have?

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4-5 Class Activity

Name _____ Date _____

CA CC Content Standards 3.NBT.1, 3.NBT.2
Mathematical Practices MP.1, MP.2, MP.8

VOCABULARY
estimate
round

▶ Estimate

Solve the problem.

1. Tasha read three books over the summer. Here is the number of pages in each book:

Watership Down	494 pages
Sounder	128 pages
The Secret Garden	368 pages

About how many pages did Tasha read? Explain how you made your **estimate**.

▶ Practice Rounding

Round each number to the nearest hundred. Use drawings or Secret Code Cards if they help you.

2. 128 → 100
3. 271 → 300
4. 376 → 400
5. 649 → 600
6. 415 → 400
7. 550 → 600
8. 62 → 100
9. 1,481 → 1,500
10. 2,615 → 2,600

11. **Explain Your Thinking** When you round a number to the nearest hundred, how do you know whether to round up or round down?

I did by useing

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Name _____ Date _____

▶ Solve Problems by Estimating

Solve by rounding to the nearest hundred. Show your work.

12. At the Lakeside School, there are 286 second graders, 341 third graders, and 377 fourth graders. About how many students are there at the Lakeside School?

1,004 Lakeside

13. Last week, Mrs. Larson drove 191 miles on Monday, 225 miles on Wednesday, and 107 miles on Friday. About how many miles did she drive altogether?

200 + 200 + 100 = 500 miles

14. Of the 832 people at the hockey game, 292 sat on the visiting team side. The rest sat on the home team side. About how many people sat on the home team side?

300 + 800 = 1,100 people

▶ Reasonable Answers

Use rounding to decide if the answer is reasonable. Then find the answer to see if you were right.

15. 604 − 180 = 586

4

16. 377 + 191 = 568

17. 268 − 17 = 107

18. 1,041 + 395 = 646

19. 407 − 379 = 28

20. 535 + 287 = 642

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Name _____ Date _____

CA CC Content Standards 3.NBT.1, 3.NBT.2
Mathematical Practices MP.1, MP.2, MP.3, MP.6, MP.8

▶ Round 2-Digit Numbers to the Nearest Ten

Round each number to the nearest ten.

1. 63 60 ☆
2. 34 30 ☆
3. 78 80 ☆
4. 25 30 ☆
5. 57 60 ☆
6. 89 90 ☆
7. 42 40 ☆
8. 92 90 ☆

▶ Round 3-Digit Numbers to the Nearest Ten

Round each number to the nearest ten.

9. 162 160 ☆
10. 741 740 ☆
11. 309 310 ☆
12. 255 260 ☆
13. 118 120 ☆
14. 197 290 ☆
15. 503 500 ☆
16. 246 250 ☆

17. **Explain Your Thinking** When you round a number to the nearest ten, how do you know whether to round up or round down?

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Name _____ Date _____

Estimate the Answer

Solve each problem.

18. The chart at the right shows how many smoothies the Juice Hut sold yesterday. By rounding each number to the nearest ten, estimate how many smoothies the Juice Hut sold in all.

10+40+40+50=150

Smoothies Sold at Juice Hut	
13	raspberry-peach smoothies
38	strawberry-banana smoothies
44	guava-mango smoothies
61	peach-blueberry smoothies

19. Ms. Singh has 52 rock CDs, 75 jazz CDs, 36 classical CDs, and 23 hip-hop CDs. Round each number to the nearest ten to find *about* how many CDs she has.

50+80+40+20=190

20. Roz rented a video that is 123 minutes long. She watched 48 minutes of it. Round each number to the nearest ten to estimate how many more minutes she has to watch.

120+50=170

Use the table at the right to solve Problems 21–23.

21. Estimate the total number of books the school received by rounding each number to the nearest hundred.

800

Jefferson Elementary School Books Received	
Math	436
Reading	352

22. Estimate the total number of books the school received by rounding each number to the nearest ten.

780

23. Find the total number of math and reading books. Which of your estimates is closer to the actual total?

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Name _____ Date _____

▶ Reasonable Answers

Use rounding to decide if the answer is reasonable. Write *yes* or *no*. Then find the answer to see if you were correct.

24. 93 − 29 = 64 Yes

25. 113 + 57 = 140 NO

26. 83 + 19 = 102 80+20=100 Yes

27. 336 + 258 = 594 340+260=600 NO

28. 438 − 158 = 280 440 - 160 = 280 Yes

29. 437 + 199 = 536 440+200=540 Yes

30. 725 − 235 = 590 Yes

31. 249 + 573 = 822 250+570=820 Yes

32. 542 − 167 = 475 540-170=370 NO

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Name _____ Date _____

▶ What's the Error?

Dear Math Students,

Today my teacher asked me to estimate the answer to this problem:

Ms. Smith's class brought in 384 soup labels. Mr. Alvarez's class brought in 524 soup labels. About how many labels did the two classes bring in?



$$\begin{array}{rr} 384 \rightarrow & 300 \\ +524 \rightarrow & +500 \\ \hline & 800 \end{array}$$

About 800 soup labels were brought in.

Is my answer correct? If not, please correct my work and tell me what I did wrong.

Your friend,
Puzzled Penguin

33. Write an answer to Puzzled Penguin.

No you are wrong ☆

▶ Estimate the Number of Objects

Jar D has 100 Beans. Estimate how many beans are in the other jars.

34. Jar A

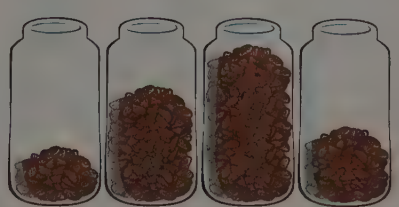
100 ☆

35. Jar B

150 ☆

36. Jar C

200 ☆



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Name _____ Date _____

CA CC Content Standards 3.NBT.2
Mathematical Practices MP.1, MP.3, MP.4

▶ Solve and Discuss

Solve each problem. Label your answer. Use your Mathboard or a separate sheet of paper.

1. Elena made necklaces for her friends. She used 586 green beads and 349 red beads. How many beads did Elena use in all?

586 + 349 = 935

938 redbeard ☆

2. Fabrice has a collection of 485 basketball cards and 217 baseball cards. How many sports cards does Fabrice have in all?

485 + 217 = 702

702 baseball cards ☆

▶ PATH to FLUENCY Introduce Addition Methods

Tonya and Mark collect seashells. Tonya has 249 shells, and Mark has 386 shells. How many shells do they have in all?

Here are three ways to find the answer:

Show All Totals Method

$$\begin{array}{r} 249 \\ +\ 386 \\ \hline 500 \\ 120 \\ +\ 15 \\ \hline 635 \end{array}$$

New Groups Below Method

$$\begin{array}{r} 249 \\ +\ 386 \\ \hline 635 \end{array}$$

New Groups Above Method

$$\begin{array}{r} {\scriptstyle 1\ 1} \\ 249 \\ +\ 386 \\ \hline 635 \end{array}$$

Proof Drawing:



6 hundreds 3 tens 5 ones

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Name _____ Date _____

PATH to FLUENCY Practice Addition Methods

Solve each problem. Make proof drawings to show that your answers are correct.

3. Ryan has two stamp albums. One album has 554 stamps, and the other has 428 stamps. How many stamps does Ryan have in all?

982 stamps ★

554
+428
982

4. One week Ashley read 269 pages. The next week she read 236 pages. What is the total number of pages she read in the two weeks?

505 pages ★

269
+236
505

5. The video store has 445 comedy videos and 615 drama videos. How many comedy and drama videos does the store have altogether?

1060 comedy ★

445
+615
1060

6. Ali has 128 photos of her pets and 255 photos of her family. How many photos does Ali have altogether?

383 photos ★

128
+255
383

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4-8 Class Activity

Name _____ Date _____

CA CC Content Standards 3.NBT.2
Mathematical Practices MP.1, MP.3, MP.4, MP.6

PATH to FLUENCY Solve and Discuss

Solve each problem using a numerical method and a proof drawing.

1. There are 359 cars and 245 trucks in the parking garage. How many vehicles are in the garage?

604 vehicles

$$\begin{array}{r} {\scriptstyle 1\ 1} \\ 359 \\ +\ 245 \\ \hline 604 \end{array}$$



2. The Creepy Crawler exhibit at the science museum has 693 spiders and 292 centipedes. How many spiders and centipedes are there in all?

995 spiders

$$\begin{array}{r} {\scriptstyle 1\ 1} \\ 292 \\ +\ 693 \\ \hline 985 \end{array}$$



3. On Saturday, 590 people went to the art museum. On Sunday, 355 went to the museum. How many people went to the museum altogether?

945 people

$$\begin{array}{r} {\scriptstyle 1\ 1} \\ 590 \\ +\ 355 \\ \hline 945 \end{array}$$



4. There were 120 people on the ferry yesterday. Today the ferry had 767 people. How many people in all were on the ferry during the past two days?

887 people

$$\begin{array}{r} {\scriptstyle 1\ 1} \\ 120 \\ +\ 767 \\ \hline 887 \end{array}$$



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4-8 Class Activity

Name _____ Date _____

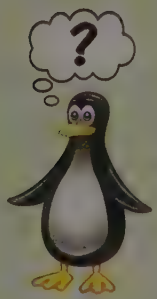
What's the Error?

Dear Math Students,

Today I found the answer to 168 + 78, but I don't know if I added correctly. Please look at my work. Is my answer right? If not, please correct my work and tell what I did wrong.

$$\begin{array}{r} 168 \\ +\ 78 \\ \hline 948 \end{array}$$

Your friend,
Puzzled Penguin



5. Write an answer to Puzzled Penguin.

No ya penguin ya should
that not write

PATH to FLUENCY Line Up the Places to Add

Write each addition vertically. Line up the places correctly. Then add and make a proof drawing.

6. 179 + 38 = 217

$$\begin{array}{r} {\scriptstyle 1\ 1} \\ 179 \\ +\ 38 \\ \hline 217 \end{array}$$

7. 650 + 345 = 995

$$\begin{array}{r} 650 \\ +\ 345 \\ \hline 995 \end{array}$$

8. 407 + 577 = 984

$$\begin{array}{r} 407 \\ -\ 577 \\ \hline 974 \end{array}$$

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Name _____ Date _____

CA CC Content Standards 3.NBT.2
Mathematical Practices MP.1, MP.2, MP.4

PATH to FLUENCY Decide When to Group

Decide which new groups you will make. Then add to see if you were correct.

1. 123 + 247 = 370
2. 358 + 434 = 792
3. 732 + 189 = 921
4. 416 + 396 = 812

Add.

5. 647 + 178 = 825
6. 132 + 763 = 895
7. 554 + 257 = 811
8. 168 + 692 = 860

9. 384 + 586 = 970
10. 631 + 189 = 820
11. 464 + 446 = 910
12. 313 + 649 = 962

13. 576 + 265 = 831
14. 389 + 511 = 900
15. 568 + 219 = 787
16. 137 + 284 = 421

Write an equation and solve the problem.

17. The first animated film at the movie theatre lasted 129 minutes. The second film lasted 104 minutes. How many minutes in all did the two movies last?

104 + 129 = 233

it lasted 233 mins total

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Name _____ Date _____

▶ Solve and Discuss

Write an equation and solve the problem.

Show Your Work.

18. Jacob has 347 basketball cards in his collection. He has 256 baseball cards. How many cards does he have altogether?

He had 603 card together

19. Jasmine's family drove for two days to visit her grandparents. They drove 418 miles on the first day and 486 miles on the second day. How many miles did they drive in all?

They drove 904 miles in all

20. The florist ordered 398 roses and 562 tulips. How many flowers did the florist order in all?

he order 960 flowers

21. Emilio checked a suitcase at the airport. His suitcase weighed 80 pounds. His wife checked three suitcases. Each of her suitcases weighed 30 pounds. How many pounds in all did their suitcases weigh?

their suitcase weigh 110 pounds

22. Write and solve an addition word problem where 287 and 614 are addends.

Joe has 287 roses and mary has 614 roses how many roses are their altogether?

They have 901 roses

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4-10 Class Activity

Name _____ Date _____

CA CC Content Standards 3.NBT.1, 3.NBT.2
Mathematical Practices MP.1, MP.4

▶ Add Three-Digit Numbers

School Carnival Rides

Rides	Tickets Sold
Twister	298
Monster Mix	229
Crazy Coaster	193
Mega Wheel	295
Bumper Cars	301



Write an equation and solve the problem. Show Your Work.

1. How many people went on the two most popular rides?

 599 people went on the rides

2. The total tickets sold for which two rides was 494?

 The rides were 193 and 301

3. Tickets for the Monster Mix and Crazy Coaster sold for $2. How much money did the school earn on the ticket sales for these two rides?

 They got $822

4. About how many tickets were sold for Twister, Monster Mix, and Mega Wheel altogether?

 They sold 822 tickets

5. The total tickets sold for which three rides equals about 900?

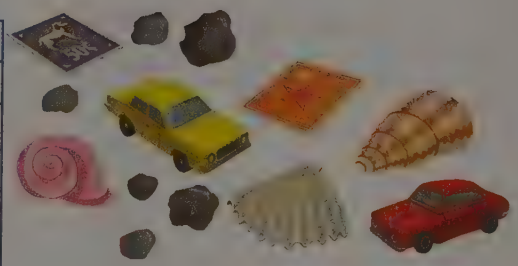
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Name _____ Date _____

Use Addition to Solve Problems

Student Collections

Type of Collection	Number of Objects
rocks	403
stamps	371
shells	198
buttons	562
miniature cars	245



Write an equation and solve the problem. Show Your Work.

6. How many objects are in the two smallest collections?

198 + 245 = 433

There are 433 objects in the two smallest collections

7. The total number of objects in two collections is 760. What are the collections?

198 + 562 = 760

The two collections are shells and buttons

8. Are the combined collections of shells and buttons greater than or less than the combined collections of rocks and stamps?

rocks and stamps are greater than shells and buttons

9. Is the estimated sum of stamps, shells, and miniature cars closer to 700 or to 800?

371 + 198 + 245 = 814

it is close to 800

10. Suppose another student has a collection of sports cards. The number of sports cards is 154 greater than the number of rocks. How many cards are in the sports cards collection?

403 + 154 = 557

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Name _____ Date _____

CA CC Content Standards 3.NBT.2
Mathematical Practices MP.1, MP.3, MP.4, MP.6, MP.7

PATH to FLUENCY Discuss Subtraction Methods

Solve this word problem.

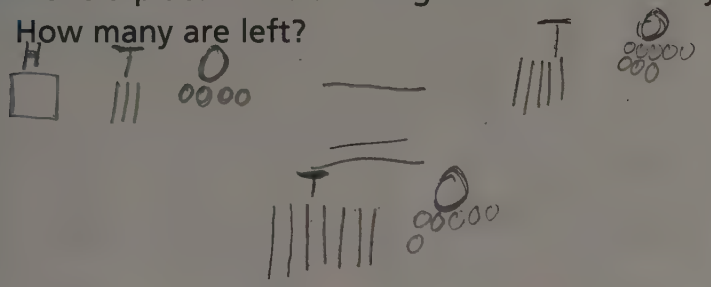
Mr. Kim had 134 jazz CDs. He sold 58 of them at his garage sale. How many jazz CDs does he have now?

12
2
0 134 14
- 58
76

1. Write a subtraction that you could do to answer this question.

Mr. Kim has 76 jazz CDs

2. Make a place value drawing for 134. Take away 58. How many are left?



3. Write a numerical solution method for what you did in the drawing.

12
2
0 134 14
- 58
76

4. Describe how you ungrouped to subtract.

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Name _____ Date _____

VOCABULARY
ungrouping
subtract

▶ What's the Error?

Dear Math Students,

Today I found the answer to 134 – 58, but I don't know if I did it correctly. Please look at my work. Is my answer right? If not, please correct my work and tell what I did wrong.



$$\begin{array}{r} 134 \\ -58 \\ \hline 124 \end{array}$$

Your friend,
Puzzled Penguin

5. Write an answer to Puzzled Penguin.

You should borrowing the numbers 4-8 so you will got everything right so borrow next time.

▶ PATH to FLUENCY Subtraction Detective

To avoid making subtraction mistakes, look at the top number closely. Do all the **ungrouping** you need to *before* you **subtract**. The magnifying glass around the top number helps you remember to be a "subtraction detective."

Subtract. Show your ungroupings numerically and with proof drawings.

6. $\begin{array}{r} 371 \\ -\ 86 \\ \hline \end{array}$

7. $\begin{array}{r} 163 \\ -\ 47 \\ \hline \end{array}$

8. $\begin{array}{r} 459 \\ -175 \\ \hline \end{array}$

9. $\begin{array}{r} 277 \\ -\ 68 \\ \hline \end{array}$

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Name _____ Date _____

CA CC Content Standards 3.NBT.2
Mathematical Practices MP.1, MP.2, MP.4

PATH to FLUENCY Ungroup to Subtract

Solve each problem. Show your work numerically and with proof drawings.

1. Lakesha bought a box of 500 paper clips. So far, she has used 138 of them. How many are left?

it is 362!

4 9 10
5 0 0
- 1 3 8
3 6 2

2. A movie theater has 400 seats. At the noon show, 329 seats were filled. How many seats were empty?

it is 71!

3 9 10
3 4 0 0
- 3 2 9
0 7 1

3. At the start of the school year, Seiko had a brand new box of 300 crayons. Now 79 crayons are broken. How many unbroken crayons does Seiko have?

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Name _____ Date _____

PATH to FLUENCY Subtract Across Zeros

Solve each problem. Show your work numerically and with proof drawings.

4. The students at Freedom Elementary School have a goal of reading 900 books. They have read 342 books. How many books do the students have left to read?

5. There are 500 fiction books in the Lee School Library. There are 179 fewer non-fiction books than fiction books. How many books are non-fiction?

6. The students at Olympia Elementary School collected 1,000 bottles for recycling. The students at Sterling Elementary collected 768 bottles. How many more bottles did the students at Olympia collect?

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Name _____ Date _____

PATH to FLUENCY Practice Subtracting Across Zeros

Subtract. Make proof drawings for Exercises 7–10 on MathBoards or on a separate sheet of paper.

7. $800 - 391$

8. $500 - 333$

9. $400 - 217$

10. $900 - 818$

11. $600 - 575$

12. $700 - 248$

13. $200 - 109$

14. $800 - 519$

15. Math Journal Write a word problem that is solved by subtracting a 2-digit number from a 3-digit number that has a zero in both the ones and tens places. Then solve the problem.

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Name _____ Date _____

PATH to FLUENCY Practice Deciding When to Ungroup

Subtract. Make proof drawings if you need to on MathBoards or on a separate sheet of paper.

16. 912 − 265

17. 323 − 147

18. 280 − 136

19. 489 − 263

20.
$$\begin{array}{r} 754 \\ -\ 389 \\ \hline \end{array}$$

21.
$$\begin{array}{r} 912 \\ -\ 437 \\ \hline \end{array}$$

22.
$$\begin{array}{r} 341 \\ -\ 178 \\ \hline \end{array}$$

23.
$$\begin{array}{r} 603 \\ -\ 464 \\ \hline \end{array}$$

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Name _____ Date _____

CA CC Content Standards 3.NBT.2
Mathematical Practices MP.1, MP.2

PATH to FLUENCY Ungroup from Left or Right

Tony and Maria each solved this problem:

On Tuesday morning, a music store had 463 copies of the new School Daze CD. By the end of the day, they had sold 275 copies. How many copies were left?

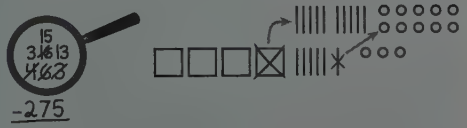
Tony

Tony started ungrouping from the left.

1. He has enough hundreds.
2. He does not have enough tens. He ungroups 1 hundred to make 10 more tens.



3. He does not have enough ones. He ungroups 1 ten to make 10 more ones.



4. Complete the subtraction.



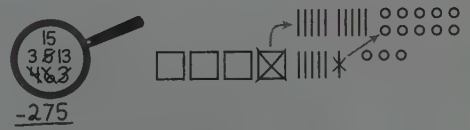
Maria

Maria started ungrouping from the right.

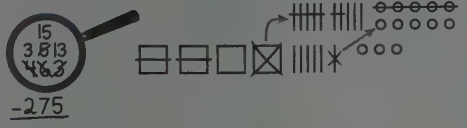
1. She does not have enough ones. She ungroups 1 ten to make 10 more ones.



2. She does not have enough tens. She ungroups 1 hundred to get 10 more tens.



3. She has enough hundreds.
4. Complete the subtraction.



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Name _____ Date _____

PATH to FLUENCY Choose a Method to Subtract

Subtract.

1. $\begin{array}{r} 686 \\ -\ 387 \\ \hline \end{array}$

2. $\begin{array}{r} 340 \\ -\ 167 \\ \hline \end{array}$

3. $\begin{array}{r} 765 \\ -\ 498 \\ \hline \end{array}$

4. $\begin{array}{r} 841 \\ -\ 253 \\ \hline \end{array}$

5. $\begin{array}{r} 912 \\ -\ 575 \\ \hline \end{array}$

6. $\begin{array}{r} 853 \\ -\ 194 \\ \hline \end{array}$

7. $\begin{array}{r} 705 \\ -\ 429 \\ \hline \end{array}$

8. $\begin{array}{r} 998 \\ -\ 299 \\ \hline \end{array}$

9. $\begin{array}{r} 513 \\ -\ 156 \\ \hline \end{array}$

10. $627 - 348$

11. $544 - 169$

12. $810 - 261$

Solve.

13. Rochelle is putting 302 digital photos in an album. Of these, 194 are from her trip to the Grand Canyon. How many photos are not from Rochelle's trip?

14. There were 645 bicycles in a race. Toby finished eighty-seventh. How many bicycles finished after Toby?

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Name _____ Date _____

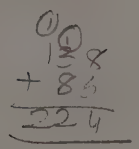
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Mathematical Practices MP.1, MP.2, MP.4

▶ PATH to FLUENCY Relate Addition and Subtraction

Solve each problem. Make a proof drawing if you need to.

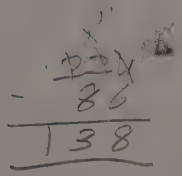
1. There were 138 students in the gym for the assembly. Then 86 more students came in. How many students were in the gym altogether?

There are 224 students in the gym



2. There were 224 students in the gym for the assembly. Then 86 students left. How many students were still in the gym?

There are 138 students left in the gym



3. Look at your addition, subtraction, and proof drawings from Problems 1 and 2. How are addition and subtraction related?

They are both same but they also have the answer problem 1 has the answer for problem 2. problem 2 has the answer for problem one.

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Name _____ Date _____

Solve and Discuss

Solve. Label your answers. *Show your work.*

4. Marly had 275 baseball cards. Her brother gave her a collection of 448 baseball cards. How many baseball cards does Marly have now?

5. Write a subtraction word problem related to the addition word problem in Problem 4. Then find the answer without doing any calculations.

6. Bill drove 375 miles on the first day of his cross-country trip. The next day he drove an additional 528 miles. How many miles did Bill drive on the first two days of his trip?

7. Write a subtraction problem related to the addition word problem in Problem 6. Then find the answer without doing any calculations.

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4-15 Class Activity

Name _____ Date _____

CA CC Content Standards 3.NBT.2
Mathematical Practices MP.1, MP.2

▶ Subtract and Check

Solve each problem. Show Your Work.

1. Ken collects photographs as a hobby. He has 375 photographs in his collection at home. If Ken brought 225 of his photographs to share with his classmates, how many photographs did he leave at home?

2. Of the 212 third- and fourth-grade students, 165 attended the school festival. How many students did not attend the festival?

3. Becky's mom has 653 CDs in her collection. Becky's aunt has 438 CDs in her collection. How many more CDs does Becky's mom have than Becky's aunt?

4. Andrea and John need 750 tickets to get a board game. They have 559 tickets. How many more tickets do they need?

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Name _____ Date _____

PATH to FLUENCY Practice Deciding When to Ungroup

Answer each question.

Adair subtracted 595 from 834.

5. Did she have to ungroup to make more tens? Explain.

6. Did she have to ungroup to make more ones? Explain.

Beatrice subtracted 441 from 950.

7. Did she have to ungroup to make more tens? Explain.

8. Did she have to ungroup to make more ones? Explain.

Wan subtracted 236 from 546.

9. Did he have to ungroup to make more tens? Explain.

10. Did he have to ungroup to make more ones? Explain.

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Name _____ Date _____

CA CC Content Standards 3.NBT.2
Mathematical Practices MP.1, MP.2

PATH to FLUENCY Practice Addition and Subtraction

Add or subtract.

1. 112 + 459	2. 572 − 357	3. 253 + 328	4. 710 − 464
5. 461 − 182	6. 540 + 175	7. 921 − 653	8. 398 − 99
9. 712 + 189	10. 600 − 223	11. 809 − 576	12. 634 + 287

Solve.

13. The height of Angeline Falls in Washington is 450 feet. Snoqualmie Falls in Washington is 182 feet lower than Angeline Falls. What is the height of Snoqualmie Falls?

14. Jill scored 534 points at the arcade on Friday night. She scored 396 points on Saturday night. How many points did she score altogether?

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Name _____ Date _____

▶ Solve Real World Problems

The students at Liberty Elementary collected pennies for a fundraiser.

Pennies Collected	
Grade	Number of Pennies
Grade 1	225
Grade 2	436
Grade 3	517
Grade 4	609
Grade 5	342

Write an equation and solve the problem. Show Your Work.

15. How many pennies did Grades 2 and 5 collect?

They collect 778 pennies

436 + 342 = 778

16. How many more pennies did Grades 1 and 3 collect than Grade 4?

They collect 132 more than 4 grade

225 + 517 = 742 ; 742 − 609 = 133

17. Is the total number of pennies collected by Grades 1 and 4 greater than or less than the total number collected by Grades 3 and 5?

grades 3 and 5 are greater that 1 and 4 grade

609 + 225 = 834 ; 517 + 347 = 864

18. The total number of pennies collected by which three grades equals about 1,000?

19. Suppose the kindergarten students collected 198 fewer pennies than the Grade 3 students. How many pennies would the kindergarteners have collected?

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Name _____ Date _____

CA CC Content Standards 3.OA.8, 3.NBT.1, 3.NBT.2
Mathematical Practices MP.1, MP.2

▶ Solve Multistep Word Problems

Solve each problem. Label your answers. Show your work.

1. Isabel bought 36 pieces of fruit for her soccer team. There are 16 apples, 12 bananas, and the rest are pears. How many pieces of fruit are pears?

 There are 8 pears.

2. Toby has a collection of sports cards. He had 13 baseball cards, 16 basketball cards, and 14 football cards. Toby sold 15 cards and he bought 17 hockey cards. What is the total number of cards in Toby's collection now?

 Now toby has 45 card than before

3. There are 15 more boys than girls in the school band. There are 27 girls. How many students are in the school band?

 there are 69 standents in the band

4. Finn delivered 13 pizzas. Then he delivered 8 more pizzas. Altogether, he delivered 6 fewer pizzas than Liz. How many pizzas did Liz deliver?

 Liz delived 27 pizzas

5. Majeed built 7 car models and 14 airplane models. Jasmine built 9 more car models than Majeed and 6 fewer airplane models. How many models did Jasmine build in all?

 Jasmine build 24 models in all.

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Name _____ Date _____

▶ Reasonable Answers

Use rounding to decide if the answer is reasonable. Write *yes* or *no*. Then find the answer to see if you were correct.

6. Nathan counted 28 large dogs and 37 small dogs at the dog park. He said he saw 55 dogs in all.

 No Nathan is wrong the answer is 65 dogs

 0
 37
 +28
 65

7. There are 122 third-and fourth-grade students at Cedar Creek Elementary School. There are 67 students in third grade and 55 students in fourth grade.

 Yes the answer is right 122 students

 0
 67
 +55
 122

8. The pet supermarket sold 245 bags of dog food and 167 bags of cat food. The supermarket sold 312 bags of pet food in all.

 The answer is wrong it has 412 bags of pet food

 00
 245
 +167
 412

9. The total distance from Charleston, West Virginia to Biloxi, Mississippi is 913 miles. Benjamin drove 455 miles from Charleston to Athens, Georgia. Then he drove 458 miles from Athens to Biloxi.

10. There were 432 people at the basketball game. 257 people sat on the home team side. 175 people sat on the visiting team side.

 Yes the answer is right

 010
 175
 +257
 432

11. The Pecos River is 234 miles longer than the Yellowstone River. The Yellowstone River is 692 miles long. The Pecos River is 826 miles long.

 The pecos river is 926 miles long

 1
 692
 +234
 926

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4-18 Class Activity

Name _____ Date _____

CA CC Content Standards 3.NBT.1, 3.NBT.2
Mathematical Practices MP.1, MP.2, MP.4, MP.5

▶ Math and Maps



The Pony Express was a mail service from St. Joseph, Missouri, to Sacramento, California. The Pony Express service carried mail by horseback riders in relays.



Use the information on the map for Problems 1–3. Write an equation and solve the problem.

1. How many miles did the Pony Express riders travel on a trip from Sacramento to Salt Lake City?

2. The total distance from St. Joseph to Fort Laramie is 616 miles. How many miles is it from Julesburg to Fort Laramie?

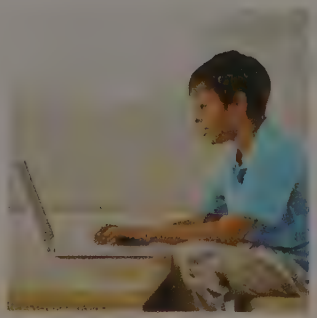
3. Write and solve a problem that can be answered using the map.

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Name _____ Date _____

▶ Use a Table

It took the Pony Express 10 days to deliver letters between Sacramento and St. Joseph. Today we send emails that are delivered within a few minutes. The chart below shows the number of emails sent in a month by different students.





Number of Emails Sent last Month					
Name	Robbie	Samantha	Ellen	Bryce	Callie
Number	528	462	942	388	489

Use the information in the table for Problems 4–6. Write an equation and solve the problem.

4. How many more emails did Robbie send than Callie?

5. How many more emails did Ellen send than Bryce and Samantha combined?

6. Tamara said that Robbie and Bryce together sent 806 emails. Is her answer reasonable? Explain. Then find the actual answer to see if you are correct.

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Name _____ Date _____

1. Select the way that shows three hundred fifty-seven. Mark all that apply.

 (A) 357

 (B) 3 hundreds + 57 tens

 (C) 3 hundreds + 5 tens + 7 ones

 (D) 

 (E) 300 + 5 + 7

2. Make a place value drawing for the number.

 691

3. A shop sells 564 posters. It sells 836 calendars. Round each number to the nearest ten to estimate about how many more calendars the shop sells than posters.

 about _____ more calendars

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Name _____ Date _____

4. Write the number in the box that shows how it should be rounded to the nearest hundred.

479	440	655	405	643

400	500	600	700

5. For numbers 5a–5e, use rounding to decide whether the answer is reasonable. Choose Yes or No.

5a. $187 - 43 = 144$ ○ Yes ○ No

5b. $328 + 87 = 385$ ○ Yes ○ No

5c. $652 + 189 = 841$ ○ Yes ○ No

5d. $1{,}293 - 126 = 367$ ○ Yes ○ No

5e. $2{,}946 - 488 = 2{,}458$ ○ Yes ○ No

6. Choose the difference that completes the number sentence.

$425 - 346 =$ ☐

79

89

121

771

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Name _____ Date _____

7. Subtract.

$700 - 255 =$

$$\begin{array}{r} 7\ 0\ 0 \\ -\ \square\ \square\ \square \\ \hline \square\ \square\ \square \end{array}$$

8. Add.

$$\begin{array}{r} 521 \\ +\ 129 \\ \hline \end{array}$$

(A) 640 (C) 650
(B) 641 (D) 651

For numbers 9 and 10, add or subtract. Make a proof drawing to show that your answer is correct.

9. $\begin{array}{r} 497 \\ +\ 326 \\ \hline \end{array}$

10. $\begin{array}{r} 690 \\ -\ 493 \\ \hline \end{array}$

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Name _____ Date _____

For numbers 11 and 12, add or subtract. Show your work.

11. 437
+ 273

Which method did you use to add?

I used the [New Groups Above / New Groups Below / Show All Totals] method.

12. 617
− 549

Did you ungroup to subtract? Explain why or why not.

13. Andre buys 860 bricks. He buys 575 red bricks and 147 tan bricks. The rest of the bricks are gray. Write and solve an equation to find how many gray bricks Andre buys.

Equation: _____

_____ gray bricks

What if Andre returns 248 red bricks, 85 tan bricks, and 58 gray bricks? How many bricks does Andre have now?

_____ bricks

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Name _____ Date _____

14. Pia collects 245 acorns in a jar. For numbers 14a–14d, select True or False for each statement.

14a. Pia collects 193 more acorns. She now has 338 acorns. ○ True ○ False

14b. Pia gives 160 acorns to Ana. She now has 85 acorns. ○ True ○ False

14c. Pia collects 286 more acorns. She uses 143 to decorate a tray. She now has 388 acorns. ○ True ○ False

14d. Pia gives her two sisters 85 acorns each. She now has 160 acorns. ○ True ○ False

15. Li earns 321 points in the first round of a math contest. He earns another 278 points in the second round and 315 points in the third round. Li says he has 804 points.

Is Li's answer reasonable? Explain.

Find the actual answer to check if you are correct.

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Name _____ Date _____

16. Darian sells 293 bags of popcorn and 321 bags of peanuts.

Part A

How many bags of popcorn and peanuts does Darian sell?

_____ bags

Part B

Write a subtraction word problem related to how many bags of popcorn and peanuts Darian sells. Then find the answer without doing any calculations.

17. A zoo has 209 reptiles. There are 93 lizards and 52 turtles. The rest are snakes. How many snakes are at the zoo?

_____ snakes

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Family Letter

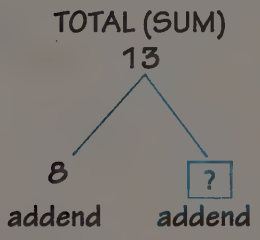
Content Overview

Dear Family,

In this unit, your child will solve addition, subtraction, multiplication, and division problems involving unknown addends and factors.

- If one of the addends is unknown, it can be found by subtracting the known addend from the total or by counting on from the known addend to the total.
- If the total is unknown, it can be found by adding the addends.
- If one of the factors is unknown, it can be found by dividing the product by the other factor.
- If the product is unknown, it can be found by multiplying the factors.

Math Mountains are used to show a total and two addends. Students can use the Math Mountain to write an equation and then solve the equation to find the unknown.



$8 + \boxed{?} = 13$

addend addend total

$5 + 8 = 13$

$13 = 8 + 5$

$13 = 5 + 8$

$13 - 5 = 8$

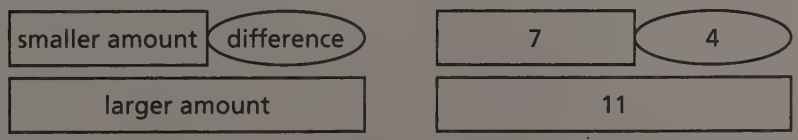
$13 - \boxed{8} = 5$

$8 = 13 - 5$

$5 = 13 - 8$

Equations with numbers alone on the left are also emphasized to help with the understanding of algebra.

Comparison Bars are used to solve problems that involve one amount that is more than or less than another amount. Drawing Comparison Bars can help a student organize the information in the problem in order to find the unknown smaller amount, the unknown larger amount, or the difference.



Please call or write if you have any questions or comments.

Sincerely,
Your child's teacher

CA CC

Unit 5 addresses the following standards from the *Common Core State Standards for Mathematics with California Additions*: **3.OA.3, 3.OA.4, 3.OA.8, 3.NBT.1, 3.NBT.2** and for all Mathematical Practices.

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Carta a la familia

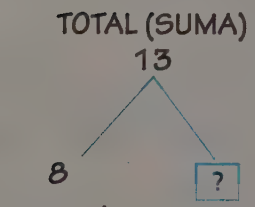
Un vistazo general al contenido

Estimada familia:

En esta unidad, su niño resolverá sumas, restas, multiplicaciones y divisiones con sumandos o factores desconocidos.

- Si uno de los sumandos se desconoce, puede hallarse restando el sumando conocido del total, o contando hacia adelante desde el sumando conocido hasta llegar al total.
- Si el total se desconoce, puede hallarse sumando los sumandos.
- Si uno de los factores se desconoce, puede hallarse dividiendo el producto entre el otro factor.
- Si el producto se desconoce, puede hallarse multiplicando los factores.

Para mostrar un total y dos sumandos se usan las **Montañas matemáticas**. Los estudiantes puede usarlas para escribir una ecuación, y al resolverla, hallar el elemento desconocido.



$8 + \boxed{?} = 13$

sumando sumando total

$5 + 8 = 13$

$13 = 8 + 5$

$13 = 5 + 8$

$13 - 5 = 8$

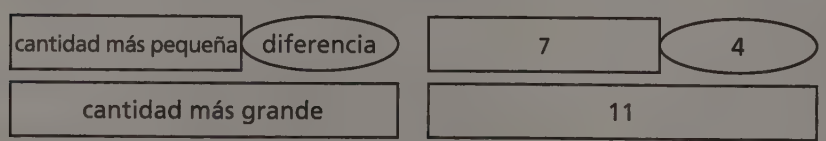
$13 - \boxed{8} = 5$

$8 = 13 - 5$

$5 = 13 - 8$

Se hace énfasis en las ecuaciones que tienen números solos en el lado izquierdo, para facilitar la comprensión del álgebra.

Para resolver problemas con una cantidad que es más o menos que otra, se usan **Barras de comparación**. Estas barras sirven para organizar la información del problema, y hallar así, la cantidad desconocida más pequeña, la más grande o la diferencia.



Si tiene alguna pregunta o algún comentario, por favor comuníquese conmigo.

Atentamente,
El maestro de su niño

CA CC

En la Unidad 5 se aplican los siguientes estándares auxiliares, contenidos en los *Estándares estatales comunes de matemáticas con adiciones para California*: **3.OA.3, 3.OA.4, 3.OA.8, 3.NBT.1, 3.NBT.2** y todos los de prácticas matemáticas.

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5-1 Class Activity

Name _____ Date _____

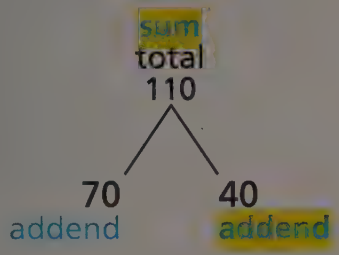
CA CC Content Standards 3.NBT.2
Mathematical Practices MP.1, MP.2, MP.4, MP.5, MP.7

VOCABULARY
total
addend
sum

▶ Math Mountains and Equations

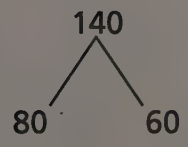
Complete.

1. Look at the Math Mountain and the 8 equations. What relationships do you see? In each equation, label each number as an **addend** (*A*) or the **total** (*T*).



110 = 70 + 40	70 + 40 = 110
___ ___ ___	___ ___ ___
110 = 40 + 70	40 + 70 = 110
___ ___ ___	___ ___ ___
40 = 110 − 70	110 − 70 = 40
___ ___ ___	___ ___ ___
70 = 110 − 40	110 − 40 = 70
___ ___ ___	___ ___ ___

2. Write the 8 equations for this Math Mountain. Label each number as the total (*T*) or an addend (*A*).



_____ _____

_____ _____

_____ _____

_____ _____

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Name _____ Date _____

▶ Solve and Discuss

Solve each problem. Label your answers.

Show your work.

3. **Add To** Chris's group picked 80 apples. His mother's group picked 60 more. How many apples do they have now?

4. **Take From** Chris's group had 140 apples. They ate 80 of them. How many apples do they have now?

5. **Put Together/Take Apart** Alison's class brought 70 juice boxes to the picnic. Taylor's class brought 50 juice boxes. How many juice boxes did they bring altogether?

6. **Put Together/Take Apart** There are 120 juice boxes at the picnic. Alison puts 70 on tables and leaves the rest in the cooler. How many juice boxes are in the cooler?

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Name _____ Date _____

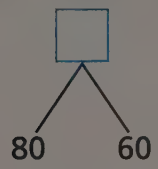
▶ Represent Word Problems with Math Tools

The equations and Math Mountains below show the word problems on page 274.

Add To

$80 + 60 = \square$

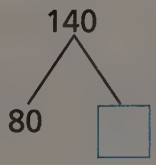
Chris's group + Mom's group = total



Take From

$140 - 80 = \square$

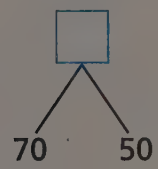
total (sum) − ate = now



Put Together/Take Apart

$70 + 50 = \square$

Alison's class + Taylor's class = total



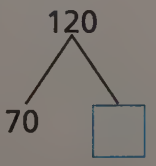
Put Together/Take Apart

$120 - 70 = \square$

total − tables = cooler

$70 + \square = 120$

tables + cooler = total



7. Write the unknown numbers in the boxes.

8. How are these math tools the same? How are they different?

9. **Math Journal** Write a word problem for this equation: $110 - 40 = \square$. Then solve it.

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Name _____ Date _____

VOCABULARY
expression
equation

PATH to FLUENCY Discuss the = and ≠ Signs

An **expression** is a combination of numbers, variables, and/or operation signs. Expressions do not have an equal sign.

An **equation** is made up of two equal quantities or expressions. An equal sign (=) is used to show that the two sides are equal.

$8 = 5 + 3$ $4 + 2 = 6$ $7 = 7$ $3 + 2 = 2 + 3$ $6 - 2 = 1 + 1 + 2$

The "is not equal to" sign (≠) shows that two quantities are not equal.

$7 \neq 5 + 3$ $4 + 2 \neq 8$ $7 \neq 6$ $6 - 2 \neq 2 + 3$ $5 + 2 \neq 1 + 1 + 3$

10. Use the = sign to write four equations. Vary how many numbers you have on each side of the sign.

11. Use the ≠ sign to write four "is not equal to" statements. Vary how many numbers you have on each side of the sign.

Write a number to make the number sentence true.

12. $160 = \square + 90$

13. $30 + \square \neq 120$

14. $70 + 20 = 20 + \square$

15. $150 - \square = 70$

16. $\square \neq 140 - 70$

17. $60 - 20 \neq 10 + 10 + \square$

Write = or ≠ to make a true number sentence.

18. $80 + 20 + 40$ ___ $90 + 50$

19. 80 ___ $60 - 20$

20. 70 ___ $40 + 30$

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5-2 Class Activity

Name _____ Date _____

CA CC Content Standards 3.NBT.2, 3.OA.3, 3.OA.4
Mathematical Practices MP.1, MP.2, MP.4, MP.5

▶ Solve Unknown Addend Word Problems

Draw a Math Mountain and write and label an equation with a variable. Then solve each problem. *Show your work.*

1. **Put Together/Take Apart: Unknown Addend** Stacy invited 90 girls and some boys to her party. 160 children were invited in all. How many boys were invited?

2. **Put Together/Take Apart: Unknown Addend** There were 150 people at the park. 70 were playing soccer. The others were playing softball. How many people were playing softball?

3. **Add To: Unknown Addend** Jan planted 80 tulips last week. Today she planted some lilies. Now she has 170 flowers. How many lilies did she plant?

4. **Take From: Unknown Addend** Tim's team had 140 tennis balls. Then his brother's team borrowed some. Now Tim's team has 60 tennis balls. How many did his brother's team borrow?

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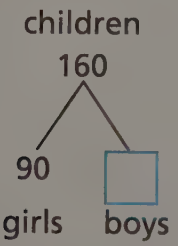
Name _____ Date _____

▶ Represent Unknown Addends with Math Tools

The equations and Math Mountains below show the word problems on page 277.

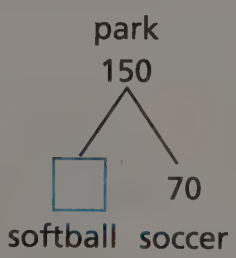
Put Together/Take Apart: Unknown Addend

90 + *b* = 160
girls boys children



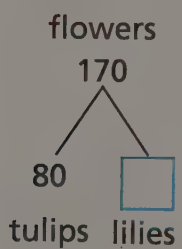
Put Together/Take Apart: Unknown Addend

150 − *s* = 70
park softball soccer



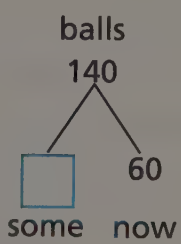
Add To: Unknown Addend

80 + *l* = 170
tulips lilies flowers



Take From: Unknown Addend

140 − *n* = 60
balls some now



5. Write the unknown numbers in the boxes and above the variables.

6. How are these math tools alike? How are they different?

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Name _____ Date _____

▶ Solve Unknown Factor Word Problems

Write an equation for each word problem. Use a variable to represent the unknown factor. Then solve the problem.

Show Your Work.

7. A toymaker has 36 boxes of toy trains to ship to 4 toy shops. Each shop will get the same number of boxes. How many boxes of toy trains will each shop get?

8. There are 56 cars in a parking lot. There are 8 rows and the same number of cars is in each row. How many cars are in each row?

9. An apartment building has 42 apartments. There are 6 apartments on each floor. How many floors are in the apartment building?

10. There are 48 students in the marching band. The students stand in equal rows of 8. How many rows of students are there?

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Name _____ Date _____

▶ Solve Unknown Factor Word Problems (continued)

Write an equation for each word problem. Use a variable to represent the unknown factor. Then solve the problem.

Show Your Work.

11. Daniel is setting up seats for the third grade play. There are 6 seats in each row. There are 54 seats in all. How many rows of seats are there?

12. Mrs. Martinez is sewing buttons on 4 costumes. Each costume has the same number of buttons. There are 32 buttons in all. How many buttons are on each costume?

13. The library received 63 new books. The librarian will put 7 books on each shelf. How many shelves are there?

14. There are 72 juice boxes for the class picnic. The juice boxes are in packs of 8. How many packs of juice boxes are there?

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5-3 Class Activity

Name _____ Date _____

CA CC Content Standards 3.NBT.2, 3.OA.3, 3.OA.4
Mathematical Practices MP.1, MP.2, MP.4, MP.5

▶ Solve Unknown Start Problems

Solve each problem. Label your answers. *Show your work.*

1. **Add To: Unknown Start** Greta puts some beads on a string. Then she puts on 70 more beads. Now there are 130 beads on the string. How many beads did she put on the string to start?

2. **Take From: Unknown Start** Greta puts some beads on a string. Seventy of the beads fell off the string. Sixty beads are still on the string. How many beads were there at first?

3. **Add To: Unknown Start** Patrick was carrying some booklets. His teacher asked him to carry 30 more booklets. Now he has 110 booklets. How many booklets did he start with?

4. **Take From: Unknown Start** Patricia was carrying some pencils. Her friend took 30 of them. Patricia has 80 pencils left. How many pencils was she carrying at first?

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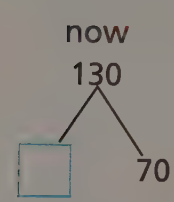
Name _____ Date _____

VOCABULARY
situation equation
solution equation

▶ Represent Unknown Start Problems with Math Tools

The equations and Math Mountains below show the word problems on page 281.

Add To: Unknown Start



situation equation:

$\square + 70 = 130$

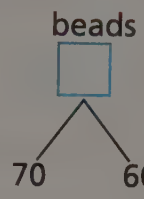
start more now

solution equation:

$70 + \square = 130$

$130 - 70 = \square$

Take From: Unknown Start



situation equation:

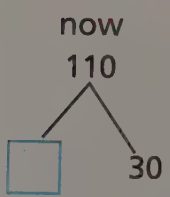
$\square - 70 = 60$

beads fell off on

solution equation:

$60 + 70 = \square$

Add To: Unknown Start



situation equation:

$\square + 30 = 110$

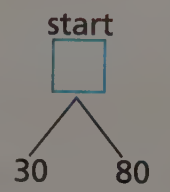
start more now

solution equations:

$30 + \square = 110$

$110 - 30 = \square$

Take From: Unknown Start



situation equation:

$\square - 30 = 80$

start friend now

solution equation:

$80 + 30 = \square$

5. Write the unknown numbers in the boxes.

6. How are these math tools alike? How are they different?

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Name _____ Date _____

▶ Write Situation and Solution Equations

Write a situation equation and a solution equation. Then solve the problem.

7. Eight vans with the same number of students in each van took 40 students to the science center for a field trip. How many students were in each van?

 Situation Equation: _____

 Solution Equation: _____

8. Fiona made some barrettes. She put 9 beads on each barrette. If she used 63 beads, how many barrettes did she make?

 Situation Equation: _____

 Solution Equation: _____

9. The pet store has 81 birds. There are 9 birds in each cage. How many cages are there?

 Situation Equation: _____

 Solution Equation: _____

10. Enrique has 56 miniature cars. He put the same number of cars on 7 shelves in his room. How many cars are on each shelf?

 Situation Equation: _____

 Solution Equation: _____

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Name _____ Date _____

▶ Write Situation and Solution Equations (continued)

Write a situation equation and a solution equation. Then solve the problem.

11. A group of 48 students from 8 schools are competing in the science fair. Each school sends the same number of students. How many students are competing from each school?

 Situation Equation: _____

 Solution Equation: _____

12. An array on one wall in an art gallery has 27 photographs. Each row has 9 photographs. How many rows are there?

 Situation Equation: _____

 Solution Equation: _____

13. Jody bought 4 bags of lemons to make lemonade. The same number of lemons was in each bag. There were a total of 36 lemons. How many lemons were in each bag?

 Situation Equation: _____

 Solution Equation: _____

14. A hardware store sold a number of furnace filters. There were 6 filters in each box. If they sold 54 furnace filters, how many boxes of filters did the hardware store sell?

 Situation Equation: _____

 Solution Equation: _____

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5-4 Class Activity

Name _____ Date _____

CA CC Content Standards 3.NBT.1, 3.NBT.2
Mathematical Practices MP.1, MP.2, MP.4, MP.8

▶ Compare Numbers

Compare the numbers. Write >, < or = in each ◯.

1. 34 ◯ 86
2. 97 ◯ 67
3. 653 ◯ 663
4. 875 ◯ 587
5. 752 ◯ 572
6. 864 ◯ 846
7. 1,932 ◯ 2,951
8. 2,633 ◯ 2,487
9. 3,478 ◯ 3,478
10. 4,786 ◯ 4,876

▶ Order Numbers

Write the numbers in order from greatest to least.

11. 69, 20, 81 _____
12. 381, 124, 197 _____

Write the numbers in order from least to greatest.

13. 2,245, 1,642, 787 _____
14. 1,987, 1,898, 1,789 _____

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Name _____ Date _____

VOCABULARY
comparison bars

▶ Discuss Comparison Problems

Solve each problem. Label your answers.

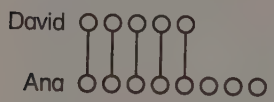
David has 5 marbles. Ana has 8 marbles.

15. How many more marbles does Ana have than David? _____

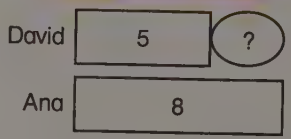
16. How many fewer marbles does David have than Ana? _____

Here are two ways to represent the comparison situation.

Comparison Drawing



Comparison Bars



Claire has 8 marbles. Sasha has 15 marbles.

Show your work.

17. How many more marbles does Sasha have than Claire? _____

18. How many fewer marbles does Claire have than Sasha? _____

Rocky has 7 fishing lures. Megan has 12 fishing lures.

19. How many fewer fishing lures does Rocky have than Megan? _____

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Name _____ Date _____

▶ Comparison Problems With an Unknown Larger or Smaller Amount

Solve each problem. Label your answers.

Show your work.

20. **Unknown Larger Amount** Maribel has 18 stickers. Arnon has 13 more stickers than Maribel. How many stickers does Arnon have?

21. **Unknown Smaller Amount** Arnon has 31 stickers. Maribel has 13 fewer stickers than Arnon. How many stickers does Maribel have?

22. **Unknown Larger Amount** Ivan has 19 goldfish. Milo has 15 more goldfish than Ivan. How many goldfish does Milo have?

23. **Unknown Smaller Amount** Milo has 34 goldfish. Ivan has 15 fewer goldfish than Milo. How many goldfish does Ivan have?

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Name _____ Date _____

▶ Use Comparison Bars to Represent an Unknown Amount

Solve each problem. Label your answers.

Show your work.

24. **Unknown Smaller Amount** T.J. has 18 fewer miniature cars than Corey. Corey has 32 miniature cars. How many miniature cars does T.J. have?

25. **Unknown Larger Amount** Corey has 18 more miniature cars than T.J. T.J. has 14 miniature cars. How many miniature cars does Corey have?

26. **Unknown Smaller Amount** Grace has 19 fewer stuffed animals than Sophia. Sophia has 31 stuffed animals. How many stuffed animals does Grace have?

27. **Unknown Larger Amount** Sophia has 19 more stuffed animals than Grace. Grace has 12 stuffed animals. How many stuffed animals does Sophia have?

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5-5 Class Activity

Name _____ Date _____

CA CC Content Standards 3.NBT.2
Mathematical Practices MP.1, MP.3, MP.6

What's the Error?

Dear Math Students,

As part of my math homework, I solved this problem:

Carlos has 19 fish. He has 14 fewer fish than Daniel. How many fish does Daniel have?

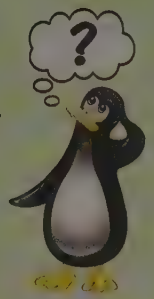
Here is what I did: 19 − 14 = 5

Daniel has 5 fish.

Carlos	19	
Daniel	?	14

Is my answer right? If not, please correct my work, and tell me what I did wrong.

Your friend,
Puzzled Penguin



1. Write an answer to Puzzled Penguin.

Solve Comparison Problems with Misleading Language

Solve each problem on a separate piece of paper.

2. **Unknown Smaller Amount** Daniel has 23 fish. He has 15 more fish than Carlos. How many fish does Carlos have?

3. **Unknown Larger Amount** Gina ran 12 laps. She ran 8 fewer laps than Bettina. How many laps did Bettina run?

4. **Unknown Smaller Amount** Bettina ran 20 laps. She ran 8 more laps than Gina. How many laps did Gina run?

5. **Unknown Larger Amount** Sara read 18 books this month. She read 13 fewer books than Lupe. How many books did Lupe read this month?

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Name _____ Date _____

▶ Solve Comparison Problems Without the Words *More* or *Fewer*

Solve each problem. Label your answers.

Show your work.

6. The coach brought 18 hockey sticks to practice. There were 23 players at practice. How many players didn't get sticks?

7. At a meeting, 15 people had to stand because there were not enough chairs. There were 12 chairs. How many people came to the meeting?

8. Jess had 16 apples. After he gave one to each of his cousins, he had 13 apples left. How many cousins does Jess have?

9. At the park, 4 of the children could not swing because there were not enough swings. There were 20 children at the park. How many swings were on the swing set?

10. Maile took one step on each tile along the garden path. After she took 14 steps, there were 13 more tiles left to go. How many tiles were there along the path?

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Name _____ Date _____

CA CC Content Standards 3.NBT.2
Mathematical Practices MP.1

▶ Solve Problems with Extra Information

Read each problem. Cross out any extra information. Then solve.

1. Emma solved 9 math problems and answered 7 reading questions. Her sister solved 8 math problems. How many math problems did they solve in all?

2. Mark had 6 shirts and 5 pairs of pants. Today his aunt gave him 4 more shirts and another pair of pants. How many shirts does he have now?

3. A parking lot had 179 cars and 95 trucks. Then 85 cars left the lot. How many cars are in the parking lot now?

4. Laura had some roses in a vase. From her garden, she picked 7 more roses and 6 daisies. Now she has 12 roses in all. How many roses did she have at first?

5. Nikko had 245 pennies and 123 nickels. His brother gave him 89 more pennies and 25 more nickels. How many pennies does Nikko have now?

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Name _____ Date _____

▶ Solve Problems with Hidden Information

Read each problem. Circle the hidden information. Then solve.

6. Samuel had 16 horseshoes in the shed yesterday. Today he put a new set of horseshoes on his horse Betsy. How many horseshoes are left in the shed?

7. Maya is going on a vacation with her family for a week and 3 days. How many days will she be on vacation?

8. Julie bought a dozen eggs at the market. She gave 3 of them to Serge. How many eggs does Julie have left?

9. Lisa had 3 quarters and 2 dimes. Then she found 3 nickels and 12 pennies. What is the value of the coins in cents she has now?

10. Marissa is moving away. She is going to move back in a year and 21 days. How many days will she be gone?

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Name _____ Date _____

▶ Recognize Word Problems with Not Enough Information

Tell what information is needed to solve each problem.

11. Sara bought 8 bananas at the fruit market. She put them in a bowl with some oranges. How many pieces of fruit are in the bowl?

12. Rebecca did 112 dives in competition last summer. This summer, she did many more dives in competition. How many competition dives did she do in the two summers?

13. Meg bought 3 mystery books and put them on the shelf with her other mystery books. How many mystery books are now on the shelf?

14. Our school has 5 soccer balls, 6 basketballs, and 4 footballs. Today, some of the footballs were lost. How many balls does the school have now?

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Name _____ Date _____

▶ Solve Word Problems with Not Enough Information

If more information is needed, rewrite the problem to include the necessary information. Then solve it.

15. Leah began fishing at 2:00 in the afternoon. She stopped at dinnertime. How many hours did Leah fish?

16. The train traveled 376 miles on Tuesday. It traveled even more miles on Wednesday. How many miles did the train travel on Tuesday and Wednesday?

17. The Kitchen Store sold 532 pans and 294 pots. Then some pans were returned. How many pans were not returned?

18. Julio and Scott played 6 card games and 4 computer games today. How many hours did they play games?

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Name _____ Date _____

CA CC Content Standards 3.OA.8
Mathematical Practices MP.1

▶ Write First Step Questions

Write the first step question and answer. Then solve the problem.

Show your work.

1. The orchard has 8 rows of apple trees. There are 7 rows with 6 apple trees and one row with 4 apple trees. How many apple trees are in the orchard?

2. Ms. Hayes bought 4 packs of pencils with 10 pencils in each pack. She divided the pencils evenly among her 5 children. How many pencils did each child get?

3. Kylen made 30 necklaces and gave 6 away. She put the rest in 4 boxes with an equal number in each box. How many necklaces were in each box?

4. Libby had 42 vacation pictures and 12 birthday pictures. She put an equal number of pictures on 9 pages in her scrapbook. How many pictures did Libby put on each page?

5. Mr. Cerda bought 9 boxes of tiles. Each box had 8 tiles. He used all but 5 of the tiles. How many tiles did Mr. Cerda use?

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Name _____ Date _____

▶ Write First Step Questions (continued)

Write the first step question and answer. Then solve the problem.

Show your work.

6. A bus has 10 seats that can each hold 2 passengers and another seat that can hold 3 passengers. How many passengers can be seated on the bus?

7. Dana made 6 fruit baskets. She put 4 apples, 2 pears, and 3 oranges in each basket. How many pieces of fruit did Dana use in all?

8. Cecilia ordered 5 pizzas for a group of friends. Each pizza had 8 slices. All but 3 slices were eaten. How many slices were eaten?

9. Randall has 122 coins in his collection. Fifty coins are quarters and the rest are nickels. If he fills 9 pages in a coin folder with the same number of nickels, how many nickels are on each page?

10. Lindsey made 6 bracelets. She used a total of 60 beads. Each bracelet has 6 beads that are silver and the rest are blue. How many beads on each bracelet are blue?

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5-8 Class Activity

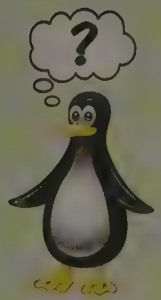
Name _____ Date _____

CA CC Content Standards 3.OA.3, 3.OA.8, 3.NBT.2
Mathematical Practices MP.1, MP.2, MP.3, MP.4, MP.6

► What's the Error?

Dear Math Students, My teacher gave me this problem:

Luther had 11 sheets of colored paper. 6 were orange, and the rest were blue. Today he used 2 sheets of blue paper. How many sheets of blue paper does Luther have now?



Here is what I did: 11 – 6 = 5
Luther now has 5 blue sheets.

Is my answer correct? If not, please correct my work and tell me what I did wrong.

Your friend,
Puzzled Penguin

1. Write an answer to Puzzled Penguin.

► Solve Two Step Word Problems

Solve each problem. Label your answers.

2. The Hillside bus had 14 passengers. When it stopped, 5 people got off and 8 people got on. How many people are riding the Hillside bus now?

3. There are 15 fish in a tank. 12 are goldfish, and the others are angelfish. How many more goldfish are there than angelfish?

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Name _____ Date _____

▶ Solve and Discuss

Solve each problem. Label your answers.

4. Sun Mi picked 14 apricots. Celia picked 5 fewer apricots than Sun Mi. How many apricots did Sun Mi and Celia pick altogether?

5. Annie took 8 photographs at home and 7 photographs at school. Her sister Amanda took 6 fewer photographs than Annie. How many photographs did Amanda take?

6. There are 5 mice, 3 gerbils, and some hamsters in a cage. Altogether there are 15 animals in the cage. How many hamsters are there?

7. A new library opened on Saturday. The library lent out 234 books on Saturday. On Sunday, they lent out 138 books. That day, 78 books were returned. How many books were not returned?

8. Katie had 8 dimes and some nickels in her duck bank. She had 4 more nickels than dimes. She took out 5 nickels to buy a newspaper. How many nickels are in her duck bank now?

9. Tony had 14 colored pencils. 9 of them needed sharpening, and the rest were sharp. Yesterday, his uncle gave him some new colored pencils. Now Tony has 12 sharp colored pencils. How many colored pencils did his uncle give him?

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Name _____ Date _____

► Is the Answer Reasonable?

Use rounding or mental math to decide if the answer is reasonable. Write *yes* or *no*. Then write an equation and solve the problem to see if you were correct. Show your work.

10. Chelsea's class collected cans of food for their local food pantry. They collected 27 cans on Monday and 78 cans on Tuesday. Then on Wednesday they collected 53 cans. How many cans did the class collect on those three days?
Answer: 158 cans

11. Barry strings beads. He had 54 beads on a string and he took off 29 beads. Then he took off 5 more. How many beads are on the string now?
Answer: 35 beads

12. Dena counted the books on three shelves of the classroom library. She counted 33 books on the top shelf, 52 books on the middle shelf, and 48 books on the bottom shelf. How many books are on the three shelves?
Answer: 163 books

13. Ms. Lance bought 6 packages of paper cups. Each package has 20 cups. She used 78 cups for a party. How many cups does Ms. Lance have left?
Answer: 58 cups

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Name _____ Date _____

▶ Reasonable Answers

Use rounding or mental math to decide if the answer is reasonable. Write *yes* or *no*. Then write an equation and solve the problem to see if you were correct.

Show your work.

14. There were 83 students in a spelling contest. In the first round 9 students were eliminated. Then 29 students were eliminated during the second round. How many students were left for the third round?
Answer: 24 students

15. During one week Tina rode her bicycle 42 miles and Jim rode 9 fewer miles than Tina. How many miles did they ride altogether that week?
Answer: 75 miles

16. Rusty volunteers at her local animal shelter. It costs $10 a day to care for a cat or dog in the shelter. The total cost to care for the animals one day was $90. There were 5 dogs at the shelter and the rest were cats. How many cats were at the shelter that day?
Answer: 9 cats

17. Jake is saving money for a new bike that costs $187. He saved $55 one month and $44 the next month. How much more money does Jake need to buy the bike?
Answer: $88

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Last Activity

CA CC Content Standards 3.OA.3, 3.OA.8, 3.NBT.2
Mathematical Practices MP.1, MP.4

▶ Equations and Two Step Word Problems

Write an equation and solve the problem. Show your work.

1. Mrs. Delgado is baking pies and cakes for a school fundraiser. She bought 26 apples, 29 peaches, and a number of bananas at the Farmers' Market. She bought 66 pieces of fruit. How many bananas did she buy?

2. Abby bought 8 packages of stickers with the same number of stickers in each package. She gave 15 stickers to her sister. Now Abby has 49 stickers. How many stickers were in each package?

3. Taylor is reading a 340-page book. He read 174 pages of the book on Saturday and 120 pages on Sunday. How many pages does he have left to read?

4. Lauren had a piece of ribbon that was 36 inches long. She cut a number of 3-inch pieces. She has 15 inches of ribbon left. How many 3-inch pieces did she cut?

5. There are 47 students in the marching band. There are 5 students in the first row, and the rest are in equal rows of 6. How many students are in each of the 6 rows?

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Name _____ Date _____

▶ Solve Two Step Word Problems

Write an equation and solve the problem. *Show your work.*

6. Sara's mother baked 48 cookies. Sara gave a dozen cookies to her neighbor and divided the remaining cookies on plates of 9 cookies each. How many plates did she use?

7. Marissa is making floral bouquets. She bought 56 carnations, 73 chrysanthemums, and some roses. She bought 153 flowers in all. How many roses did she buy?

8. Thomas has 103 photos on his digital camera. He deletes 33 because they are out of focus. He wants to print the remaining photos and put an equal number on each page of an album that has 10 pages. How many photos will be on each page?

9. Leo bought 6 sets of books. Each set had the same number of books. He donated 11 books to the school library. Now he has 37 books left. How many books were in each set of books Leo bought?

10. Amber has 5 packages of chalk. Each package has 9 pieces of chalk. She gave a number of pieces of chalk to her brother. Amber has 37 pieces of chalk left. How many pieces did Amber give her brother?

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5-10 Class Activity

Name _____ Date _____

CA CC Content Standards 3.OA.3, 3.OA.8, 3.NBT.2
Mathematical Practices MP.1, MP.4

▶ Write Two Step Equations

Write an equation and solve the problem. *Show your work.*

1. Carrie sold 7 toys for 50¢ each and 1 toy for 75¢. How much money, in cents, did Carrie make?

2. Darin earns $8 each week doing chores. He is saving his money to buy a game that costs $49 and a cap that costs $15. How many weeks will Darin need to save his money?

3. A dog trainer is working with 7 dogs. He rewards each dog with the same number of treats. He started with 35 treats and he has 7 left. How many treats did he give each dog?

4. Sheila has two dogs. One dog weighs 46 pounds and her other dog weighs 14 pounds more. How many pounds do the two dogs weigh altogether?

5. Eli has 36 stamps and his brother has 24 stamps. They put their stamps in the same book. They put the same number of stamps on each page. They used 10 pages. How many stamps are on each page?

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Name _____ Date _____

▶ Write Two Step Equations (continued)

Write an equation and solve the problem. *Show your work.*

6. There were 9 rows of chairs set up in the school gym. Each row had 20 chairs. After the students were seated, there were 12 empty chairs. How many chairs were filled?

7. Eric had 143 baseball cards. His uncle gave him a number more. Then Eric gave 26 cards to a friend. He has 184 cards now. How many cards did Eric's uncle give him?

8. Brandi had 8 equal rows of stickers. She bought 5 more and now she has 53 stickers. How many were in each row before she bought more?

9. Randall cut a board into two pieces. One piece has a length of 84 inches. The other piece is 24 inches shorter. How long was the board Randall cut?

10. A science poster shows 9 insects with 6 legs each and a spider with 8 legs. How many legs is that altogether?

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5-11 Class Activity

Name _____ Date _____

CACC Content Standards 3.OA.3, 3.OA.8, 3.NBT.1, 3.NBT.2 Mathematical Practices MP.1, MP.2, MP.4

▶ Math and News

Little League Baseball Championships: Wheaton Wolves Score Win

Wheaton Wolves win Little League World Series Championship. The chart shows some statistics from the six games the team played.



Wheaton Wolves Statistics	
Times at Bat	155
Hits	47
Base on Balls	25
Runs Scored	36
Strike Outs	36

Use the information in the table to write an equation and solve the problem.

1. How many times at bat did players not strike out or get a base on balls?

2. How many hits and base on balls did not result in a run?

3. The Wheaton Wolves had 13 triple or double-base hits, 3 homeruns, and the rest were single-base hits. How many single-base hits did the team get?

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Name _____ Date _____

▶ Sports News



Danielle plays on a third grade basketball team in a league. Her team made the news when they scored 47 points, 41 points, and 53 points in a three-game tournament.

Write a two step equation and solve the problem.

4. How many points did Danielle's team score altogether?

5. Describe a method you could use to decide if your answer to Problem 4 is reasonable.

6. Danielle's scorecard shows her statistics for the three games. Use the information in the table to write equations to find the unknown numbers. Then complete the table.

	Number of 1-pt Free Throws	Number of 2-pt Field Goals	Total Points
Game 1	5	7	
Game 2		6	18
Game 3	3		21

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Name _____ Date _____

1. Mr. Taylor arranges some chairs in rows. He puts the same number of chairs in each of 7 rows and puts 7 chairs in the last row. He sets up 70 chairs. How many chairs does he put in each of the 7 equal rows?

 Choose the equation that can be used to solve the problem.

 I can use the equation

 $(7 \times c) + 7 = 70$

 $(70 \div 7) + 7 = c$

 $(7 \times c) - 7 = 70$

 Solve the problem.

 _____ chairs

2. Marisol picks 150 flowers. She picks 80 red flowers and the rest are yellow. She sells 45 yellow flowers. How many yellow flowers does she have now?

 For numbers 2a–2e, choose Yes or No to tell whether the equation can be used to find the number of yellow flowers Marisol has now.

 2a. $150 - 80 - 45 = y$ ○ Yes ○ No

 2b. $150 + 80 - 45 = y$ ○ Yes ○ No

 2c. $150 + 80 + 45 = y$ ○ Yes ○ No

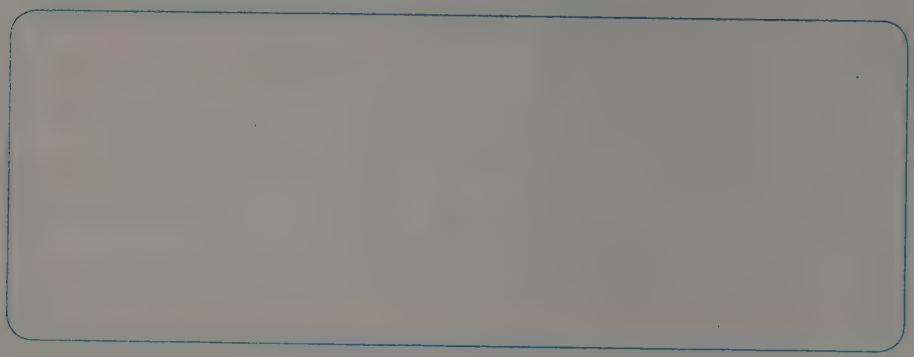
 2d. $150 = 80 + 45 + y$ ○ Yes ○ No

 2e. $150 = 80 - 45 + y$ ○ Yes ○ No

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Name _____ Date _____

3. Mark makes 18 picture frames this month. He makes 7 fewer picture frames than Sara. How many picture frames does Sara make?
Draw comparison bars to represent the problem. Then solve.



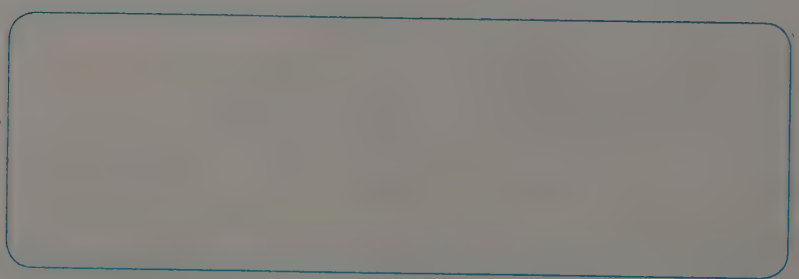
_____ picture frames.

4. David and Marne pick cucumbers at a farm. David picks 93 cucumbers. How many cucumbers does Marne pick?

What information is not helpful for solving the problem?

(A) how many more cucumbers David picks
(B) how many fewer cucumbers Marne picks
(C) how many cucumbers are grown at the farm each year
(D) how many cucumbers David and Marne pick

Rewrite the problem to include the necessary information. Then solve it.



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Name _____ Date _____

5. There are 240 boys and girls in a soccer league. There are 130 girls. How many boys are there?

Write an equation with a variable to represent the problem. Then draw a Math Mountain to solve the problem.

_____ boys

6. On Wednesday, Jonah sees 30 birds and 4 rabbits. Of the birds, 13 are robins and the rest are pigeons. On Thursday, he sees some more pigeons. He has now seen 21 pigeons. How many pigeons did he see on Thursday?

Part A

Write the information in the correct box.

30 birds 4 rabbits 13 robins 21 pigeons

Needed Information	Extra Information

Part B

Solve the problem. What strategy did you use? How did it help?

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Name _____ Date _____

7. Susan buys 24 postcards. She sends 6 postcards to friends. She puts the rest in 3 folders, with an equal number in each folder. How many postcards are in each folder?

Write the first step question and answer. Then solve.

_____ postcards

8. Kato uses 56 photos to make online albums. He puts 7 photos in each album. How many albums does Kato make?

For numbers 8a–8d, select True or False if the equation can be used to solve the problem.

8a.	$7 \times a = 56$	○ True	○ False
8b.	$56 \div 7 = a$	○ True	○ False
8c.	$7 \times 56 = a$	○ True	○ False
8d.	$56 \div a = 7$	○ True	○ False

9. Tara posts 35 flyers for the school carnival. Keisha posts 8 more flyers than Tara. How many flyers did Tara and Keisha post? Choose the number that completes the sentence.

Tara and Keisha post [43 / 62 / 78] flyers.

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Name _____ Date _____

10. Jason packs 54 grapefruit in 9 boxes for shipping. He packs the same number of grapefruit in each box. How many grapefruit does Jason pack into each box?

Use the numbers and symbols to write a situation equation and a solution equation. Then solve.

g	9	54	×	÷	=

Situation Equation: _____

Solution Equation: _____

_____ grapefruit

11. Declan reads 19 books. He reads 13 fewer books than Ellie. How many books does Ellie read?

_____ books

12. Parker has 452 toy dinosaurs in his collection. His sister gives him 38 more toy dinosaurs. Then he sells some of them online. Parker now has 418 toy dinosaurs. How many did he sell?

Answer: 72 toy dinosaurs

Is the answer reasonable? Tell why or why not. Then write an equation and solve the problem.

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Name _____ Date _____

13. Eva buys some items at the store and pays with pennies and nickels. Use the information in the table to write equations to find the unknown numbers. Then complete the table.

Pencil: _____

Eraser: _____

Clip: _____

	Number of Pennies	Number of Nickels	Total Cost
Pencil	6	8	¢
Eraser		4	24¢
Clip	2		37¢

14. Holly is going to the beach in 2 weeks and 4 days.

Which equation can be used to find the number of days until Holly goes to the beach?

Ⓐ $2 \times 7 + 4 = b$; $b = 18$ days

Ⓑ $2 \times 5 + 4 = b$; $b = 14$ days

Ⓒ $2 + 7 + 4 = b$; $b = 13$ days

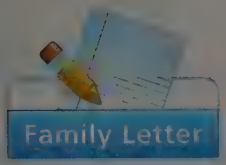
Ⓓ $2 \times 7 - 4 = b$; $b = 10$ days

15. Omar has 5 ties and Ryan has 12 ties. How many more ties does Ryan have than Omar?

Make a comparison drawing to represent the problem. Then solve.

_____ more ties

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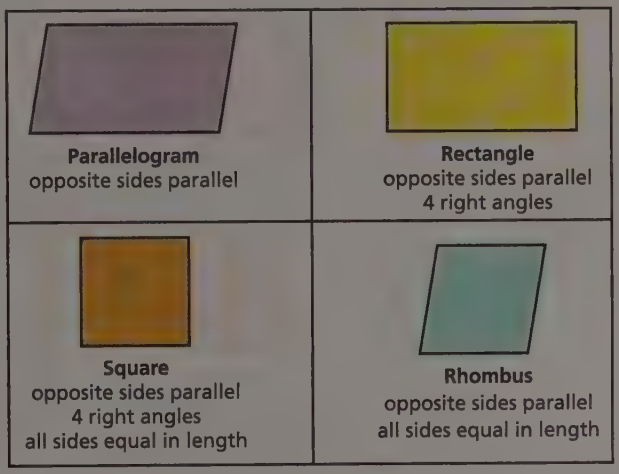


Content Overview

Dear Family,

Your student will be learning about geometry and measurement during this school year. This first part of Unit 6 is about the geometric figures called quadrilaterals. These get their name because they have four (*quad-*) sides (*-lateral*).

Here are some examples of quadrilaterals students will be learning about in this unit.



Students will be able to recognize and describe different quadrilaterals by their sides and angles. Some sides may be of equal length. Some sides may be parallel; they do not meet no matter how far they are extended. Some sides may be perpendicular; where they meet is like the corner of a square.

If you have any questions, please call or write to me.

Thank you.

Sincerely,
Your child's teacher

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CACC

Unit 6 addresses the following standards from the *Common Core State Standards for Mathematics with California Additions*: **3.G.1, 3.G.2, 3.MD.5, 3.MD.5a, 3.MD.5b, 3.MD.6, 3.MD.7, 3.MD.7a, 3.MD.7b, 3.MD.7c, 3.MD.7d, 3.MD.8,** and all Mathematical Practices.

Carta a la familia

Un vistazo general al contenido

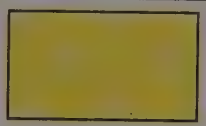
Estimada familia:

Durante este año escolar, su niño aprenderá acerca de geometría y medición. La primera parte de la Unidad 6 trata sobre las figuras geométricas llamadas cuadriláteros. Se llaman así porque tienen cuatro (*quadri-*) lados (*-lateris*).

Aquí se muestran algunos ejemplos de cuadriláteros que los estudiantes estudiarán en esta unidad.



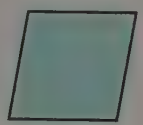
Paralelogramo
lados opuestos paralelos



Rectángulo
lados opuestos paralelos
4 ángulos rectos



Cuadrado
lados opuestos paralelos
4 ángulos rectos
todos los lados de igual longitud



Rombo
lados opuestos paralelos
todos los lados de igual longitud

Los estudiantes podrán reconocer y describir diferentes cuadriláteros según sus lados y ángulos. Algunos lados pueden tener la misma longitud. Algunos lados pueden ser paralelos; nunca se juntan, no importa cuánto se extiendan. Algunos lados pueden ser perpendiculares; donde se juntan es como el vértice de un cuadrado.

Si tiene alguna pregunta o algún comentario, por favor comuníquese conmigo.

Gracias.

Atentamente,
El maestro de su niño

CA CC

En la Unidad 6 se aplican los siguientes estándares auxiliares, contenidos en los *Estándares estatales comunes de matemáticas con adiciones para California*: **3.G.1, 3.G.2, 3.MD.5, 3.MD.5a, 3.MD.5b, 3.MD.6, 3.MD.7, 3.MD.7a, 3.MD.7b, 3.MD.7c, 3.MD.7d, 3.MD.8** y todos los de prácticas matemáticas.

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6-1 Class Activity

Name _____ Date _____

CA CC Content Standards 3.G.1, 3.G.2
Mathematical Practices MP.2, MP.5, MP.7

VOCABULARY
ray
angle
right angle

▶ Types of Angles

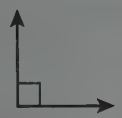
A **ray** is part of a line that has one endpoint and continues forever in one direction. To draw a ray, make an arrow to show that it goes on forever.



Two line segments or two rays that meet at an endpoint form an **angle**.

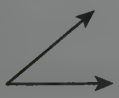


An angle that forms a square corner is called a **right angle**.

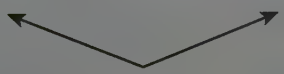


right angle

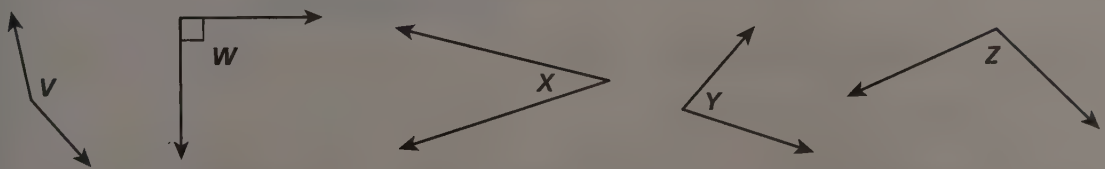
Some angles are smaller than a right angle.



Some angles are larger than a right angle.



These angles are named with a letter in the corner.



1. Which of the angles are right angles? W

2. Which of the angles are smaller than a right angle? X and Y

3. Which of the angles are larger than a right angle? V and Z

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Name _____ Date _____

VOCABULARY
triangle

▶ Describe Triangles by Types of Angles

Triangles can be described by the types of angles they have.

In these triangles, one angle is a right angle.



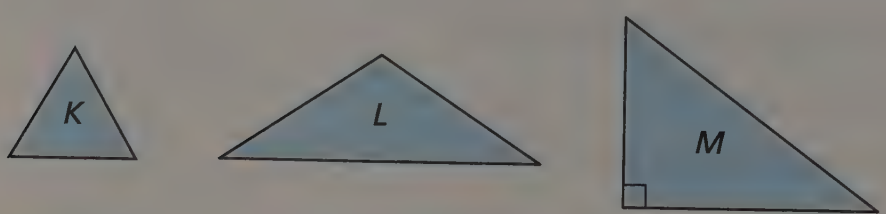
In these triangles, three angles are smaller than a right angle.



In these triangles, one angle is larger than a right angle.



Use triangles *K*, *L*, and *M* for Exercises 4–6.



4. Which triangle has one right angle?

M

5. Which triangle has three angles smaller than a right angle?

K

6. Which triangle has one angle larger than a right angle?

L

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Name _____ Date _____

▶ Describe Triangles by the Number of Sides of Equal Length

You can also describe triangles by the number of sides that are of equal length.

In these triangles, three sides are equal in length.



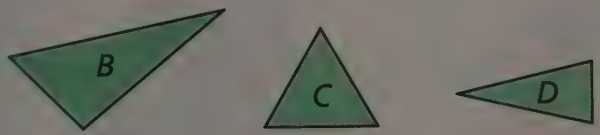
In these triangles, two sides are equal in length.



In these triangles, no sides are equal in length.



Use triangles *B*, *C*, and *D* for Exercises 7–9.



7. Which triangle has 3 sides of equal length?

C

8. Which triangle has 2 sides of equal length?

D

9. Which triangle has 0 sides of equal length?

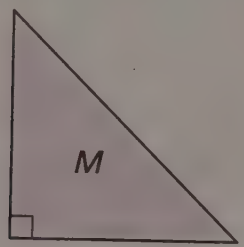
B

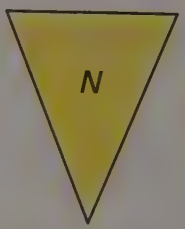
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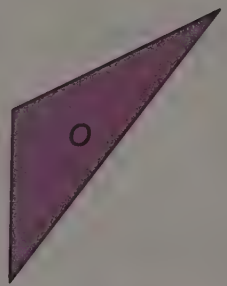
Name _____ Date _____

Describe Triangles by Types of Angles and Number of Sides of Equal Length

Use triangles *M*, *N*, and *O* for 10–12. Write *M*, *N*, or *O*. Then complete the sentences.





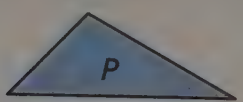


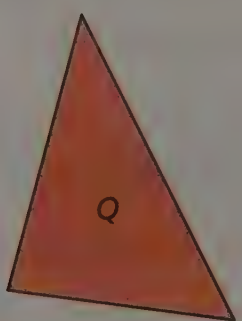
10. Triangle O has 1 angle larger than a right angle and has 0 sides of equal length.

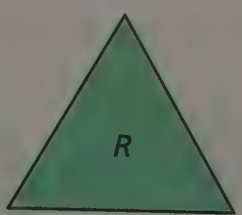
11. Triangle M has 1 right angle and has 2 sides of equal length.

12. Triangle N has 3 angles smaller than a right angle and has 2 sides of equal length.

Use triangles *P*, *Q*, and *R* for 13–15. Write *P*, *Q*, or *R*. Then complete the sentences.







13. Triangle R has 3 angles smaller than a right angle and has 3 sides of equal length.

14. Triangle Q has 3 angles smaller than a right angle and has 0 sides of equal length.

15. Triangle P has 1 angle larger than a right angle and has 0 sides of equal length.

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6-1 Class Activity

Name _____ Date _____

VOCABULARY
quadrilateral

▶ Build Quadrilaterals from Triangles

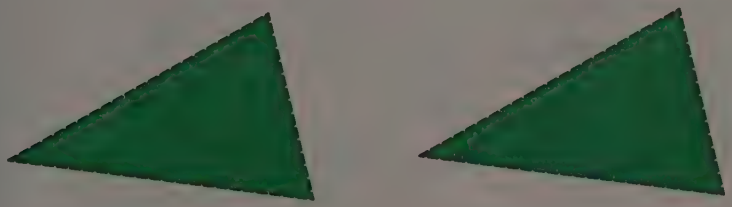
A **quadrilateral** is a figure with 4 sides.

Cut out each pair of triangles. Use each pair to make as many different quadrilaterals as you can. You may flip a triangle and use the back. On a separate piece of paper, trace each quadrilateral that you make.

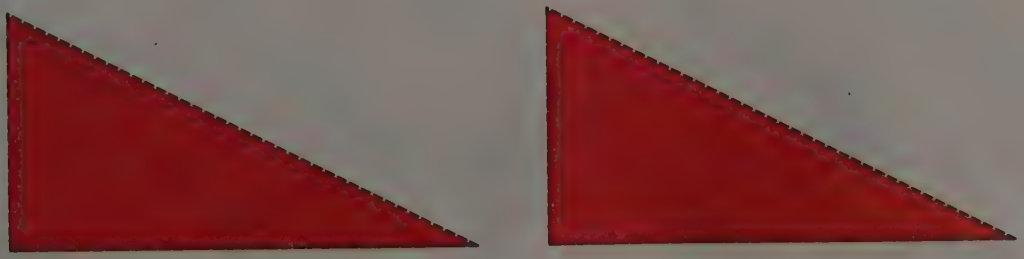
Triangles with One Angle Larger Than a Right Angle



Triangles with Three Angles Smaller Than a Right Angle



Triangles with One Right Angle



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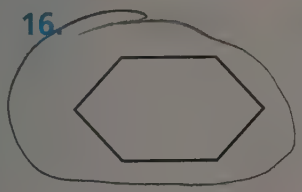
Name _____ Date _____

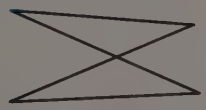
VOCABULARY
polygon
concave
convex

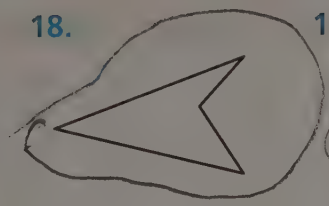
▶ Polygons

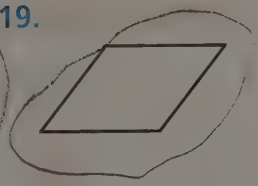
A **polygon** is a flat, closed figure made up of line segments that do not cross each other.

Circle the figures that are polygons.

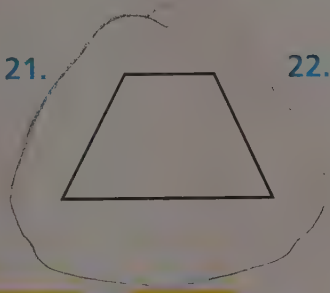
16. 

17. 

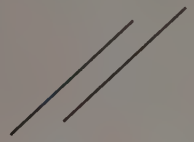
18. 

19. 

20. 

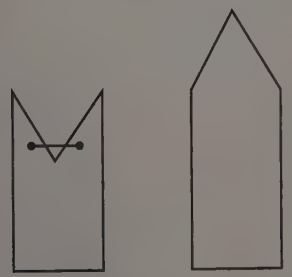
21. 

22. 

23. 

A figure can be **concave** or **convex**. In concave polygons, there exists a line segment with endpoints inside the polygon and a point on the line segment that is outside the polygon. A convex figure has no such line segment.

Which figures are convex and which are concave?



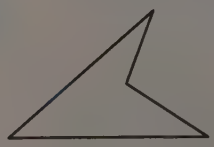
concave convex

24. 

convex

25. 

concave

26. 

concave

27. 

convex

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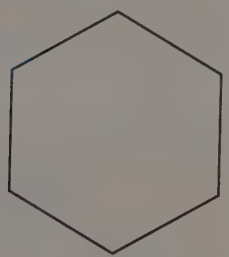
VOCABULARY
pentagon hexagon
octagon decagon

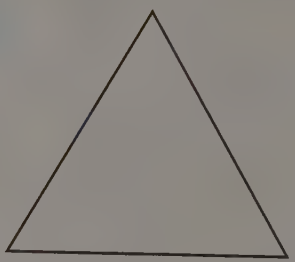
▶ Name Polygons

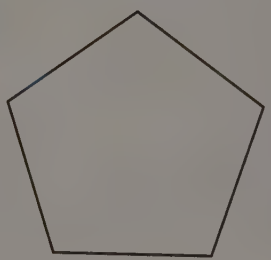
Polygons are named according to how many sides they have.

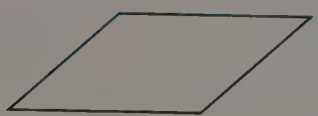
3 sides – **tri**angle
4 sides – **quad**rilateral
5 sides – **penta**gon
6 sides – **hexa**gon
8 sides – **octa**gon
10 sides – **deca**gon

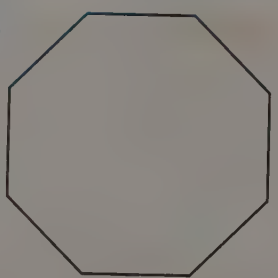
Name each figure.

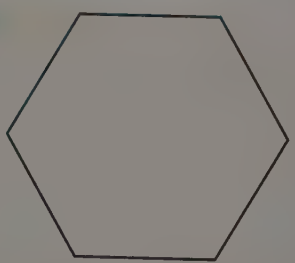
28. 
hexagon

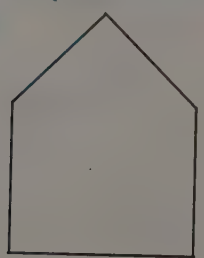
29. 
triangle

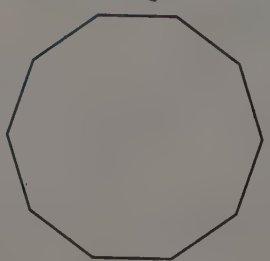
30. 
pentagon

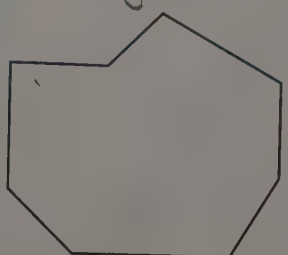
31. 
quadrilateral

32. 
octagon

33. 
hexagon

34. 
pentagon

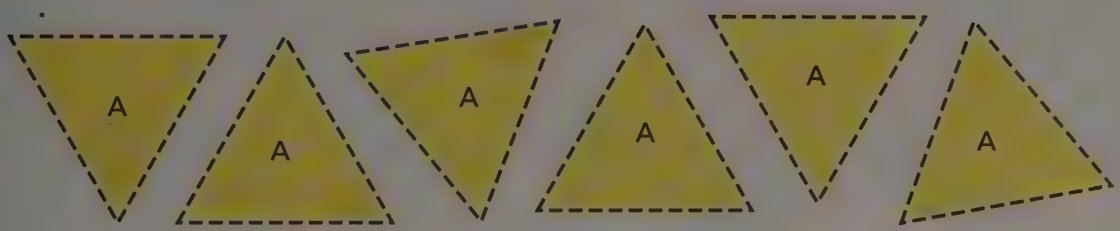
35. 
decagon

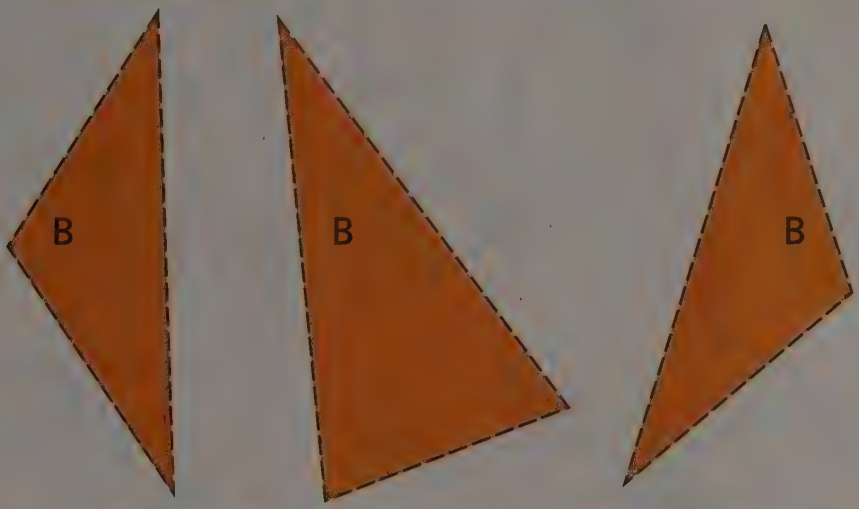
36. 
octagon

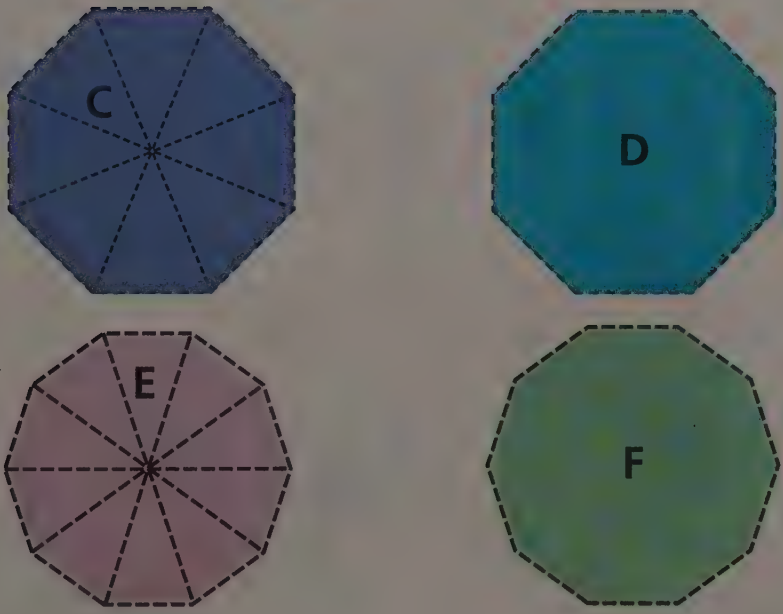
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▶ Build Polygons from Triangles







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6-2 Lesson Activity

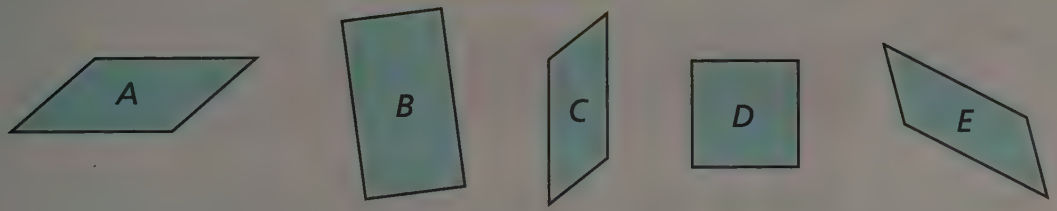
Name _____ Date _____

CA CC Content Standards 3.G.1
Mathematical Practices MP.6, MP.7

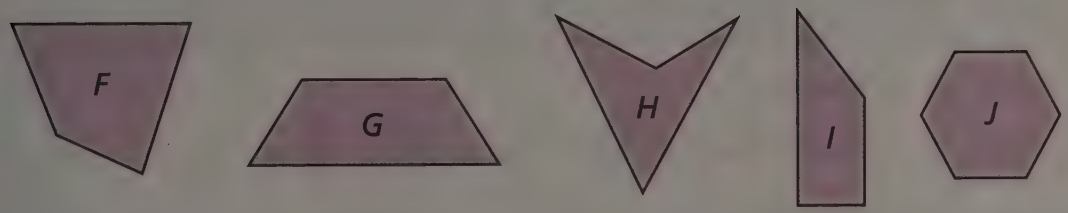
VOCABULARY
parallelogram

▶ Describe Parallelograms

All of these figures are **parallelograms**.



These figures are not parallelograms.



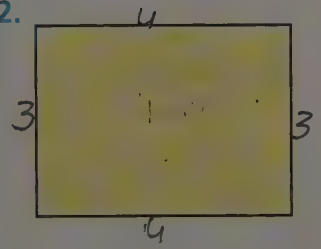
Complete the sentence.

1. A parallelogram is a quadrilateral with opposite parallel sids

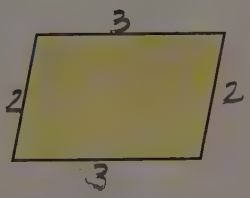
▶ Measure Sides of Parallelograms

For each parallelogram, measure the sides to the nearest cm and label them with their lengths.

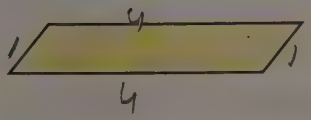
2.



3.



4.



5. Look at the lengths of the sides. What patterns do you notice? The opposide sides are

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6-2 Class Activity

Name _____ Date _____

VOCABULARY
rectangle
square
rhombus

▶ Describe Rectangles

All of these figures are **rectangles**.



Adel said, "Rectangles are special kinds of parallelograms."

Complete the sentence.

6. A rectangle is a parallelogram with 4 right angles

▶ Explore Squares and Rhombuses

These figures are **squares**.



These figures are **rhombuses**.



Takeshi said, "Squares are special kinds of rectangles."

Cora said, "Rhombuses are special kinds of parallelograms."

Complete the sentence.

7. A square is a rectangle with 4 equal sides

8. A rhombus is a parallelogram with all sides the same length

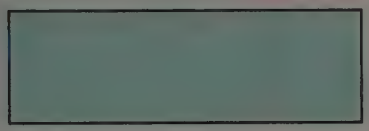
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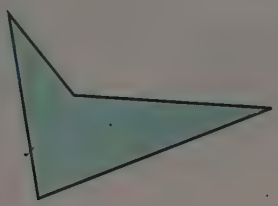
▶ Describe Quadrilaterals

Use as many words below as possible to describe each figure.

quadrilateral	parallelogram	rectangle	square

9. 

quadrilateral
parallelogram
rectangle

10. 

quadrilateral

11. 

square
quadrilateral
rectangle
parallelogram

12. 

quadrial
parallelogram

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6-2 Class Activity

Name _____ Date _____

VOCABULARY
trapezoid
opposite sides

▶ Describe Trapezoids

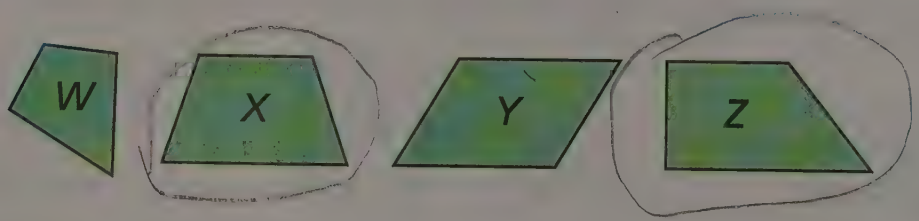
The quadrilaterals below are **trapezoids**.



13. Write what you know about the **opposite sides** of a trapezoid.

1 pair of sides is parllel

14. Circle the quadrilaterals that are trapezoids.



15. Explain why the figures you did not circle are not trapezoids.

dose not have a pair of parallel sides

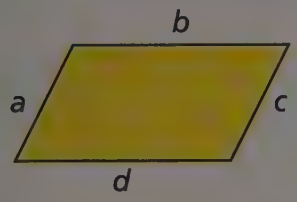
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6-3 Class Activity

Name _____ Date _____

CA CC Content Standards 3.G.1
Mathematical Practices MP.5, MP.7

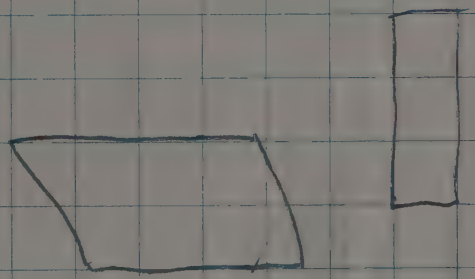
Draw Parallelograms



1. Write what you know about the opposite sides of a parallelogram.

opposite sides are called parallel

2. Draw three different parallelograms.

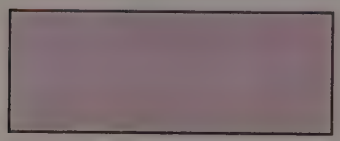


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Name _____ Date _____

VOCABULARY
adjacent sides

Draw Rectangles



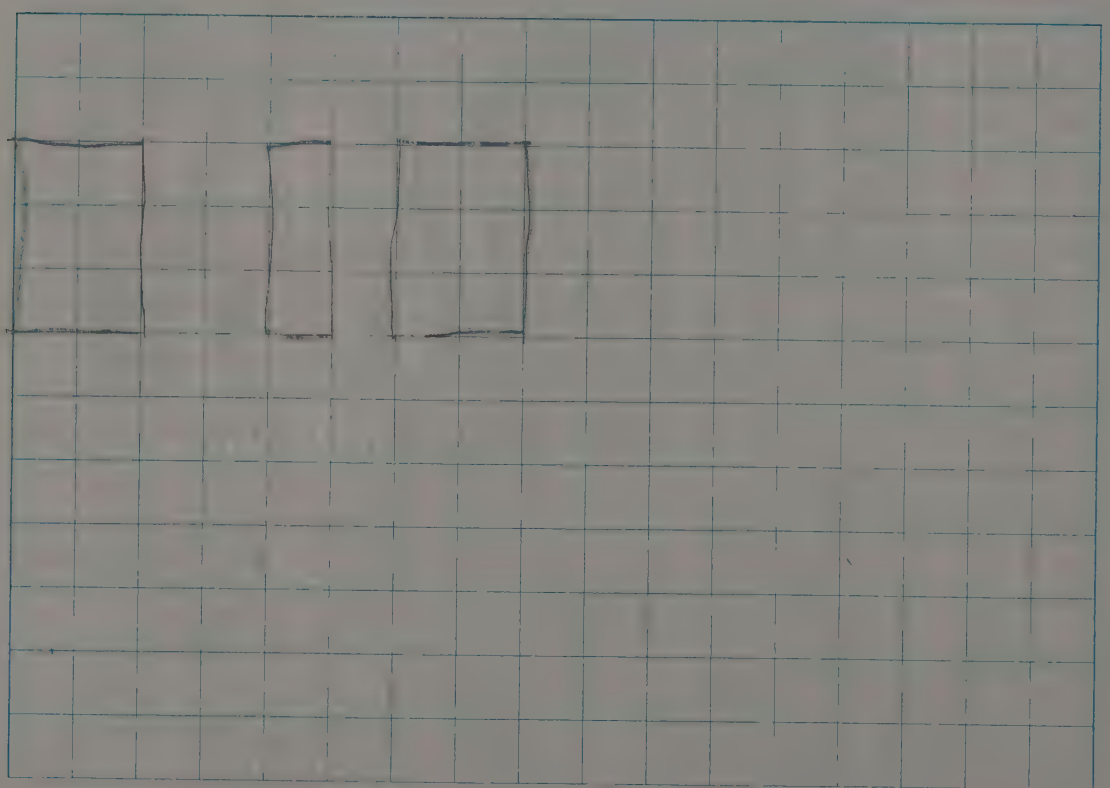
3. Write everything you know about the opposite sides of a rectangle.

The opposite sides are 2 equal sides

4. What do you know about the **adjacent sides** of a rectangle?

adjacent sides are right angles

5. Draw three different rectangles.



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Name _____ Date _____

▶ Draw Squares and Rhombuses



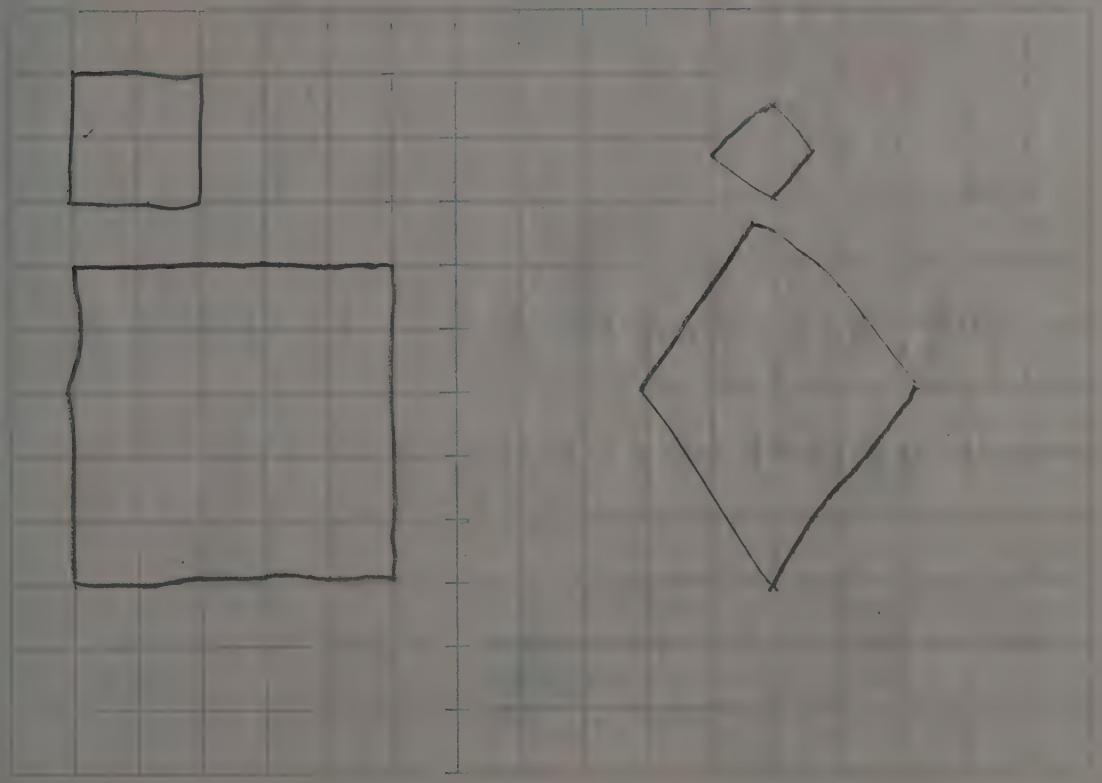
6. Write everything you know about squares.

squares are rectangles and rhombus.

7. Write all you know about rhombuses.

Rhombuses are a parallelograms

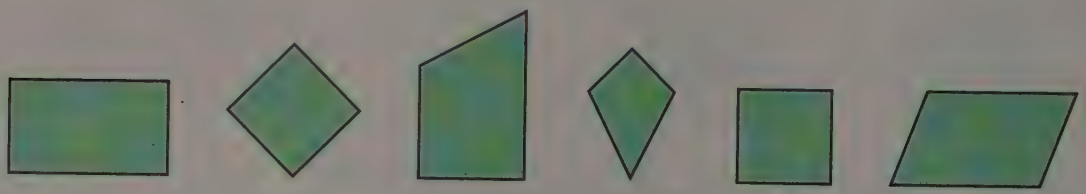
8. Draw two different squares and two different rhombuses.



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Name _____ Date _____

▶ Draw Quadrilaterals That Are Not Squares, Rectangles, or Rhombuses



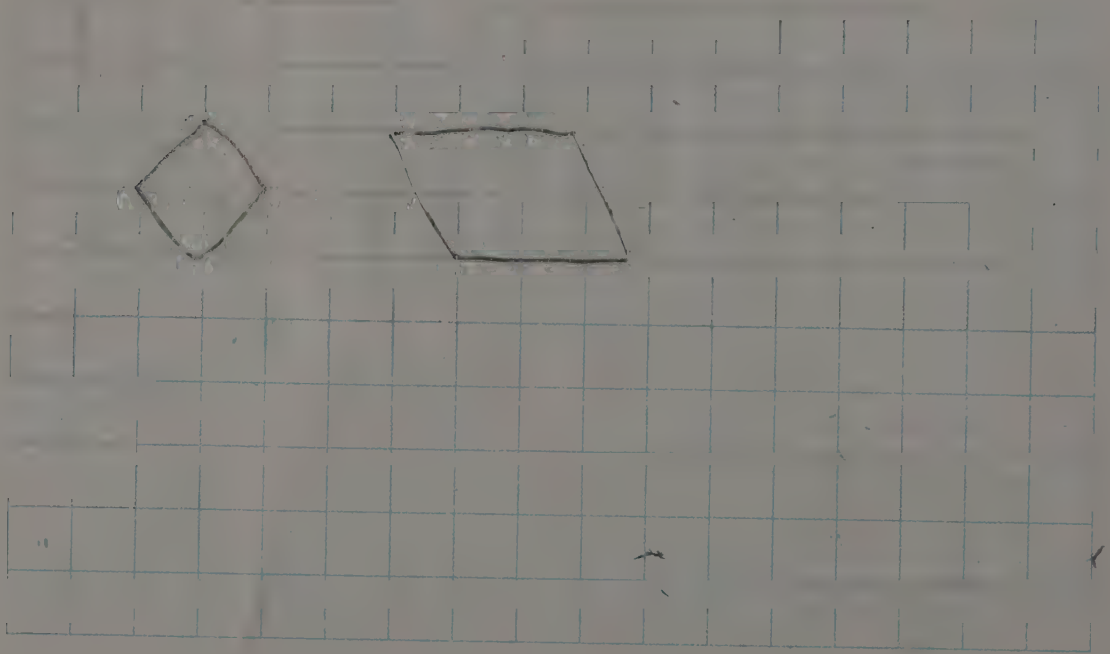
9. What is a quadrilateral?

quadrilateral has 4 sides

10. Name all the quadrilaterals that have at least one pair of parallel sides.

square

11. Draw three different quadrilaterals that are not squares, rectangles, or rhombuses.



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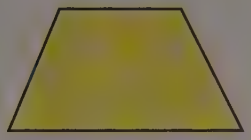
CA CC Content Standards 3.G.1
Mathematical Practices MP.3, MP.6, MP.7, MP.8

▶ Name Quadrilaterals

Place a check mark beside every name that describes the figure.

1. 

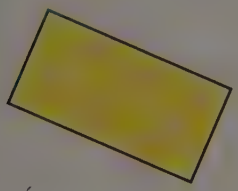
- [x] quadrilateral
- [x] parallelogram
- [x] rhombus
- [] rectangle
- [] square

2. 

- [x] quadrilateral
- [] parallelogram
- [] rhombus
- [] rectangle
- [x] trapezoid

3. 

- [x] quadrilateral
- [x] parallelogram
- [x] rhombus
- [x] rectangle
- [x] square

4. 

- [x] quadrilateral
- [x] parallelogram
- [] rhombus
- [x] rectangle
- [] square

5. 

- [x] quadrilateral
- [x] parallelogram
- [] rhombus
- [] rectangle
- [] square

6. 

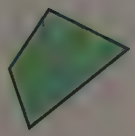
- [x] quadrilateral
- [x] parallelogram
- [x] rhombus
- [x] rectangle
- [x] square

7. 

- [x] quadrilateral
- [] parallelogram
- [] rhombus
- [] rectangle
- [] square

8. 

- [x] quadrilateral
- [] parallelogram
- [] rhombus
- [] rectangle
- [] square

9. 

- [x] quadrilateral
- [] parallelogram
- [] rhombus
- [] rectangle
- [] square

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Name _____ Date _____

▶ Analyze Quadrilaterals

10. For each figure, put Xs under the descriptions that are always true.

	Four sides	Both pairs of opposite sides parallel	Both pairs of opposite sides the same length	Four right angles	All sides the same length
Quadrilateral	✓				
Trapezoid	✓				
Parallelogram	✓	✓			
Rhombus	✓	✓	✓		✓
Rectangle	✓	✓	✓	✓	
Square	✓	✓	✓	✓	✓

Use the finished chart above to complete each statement.

11. Parallelograms have all the features of quadrilaterals *plus*
both pairs of opp. sides are parallel

12. Rectangles have all the features of parallelograms *plus*
both pairs of opp. sides the same length, four right angles

13. Squares have all the features of quadrilaterals *plus*
four sides, both pairs of opp. sids parallel

14. Trapezoids have all the features of quadrilaterals *plus*

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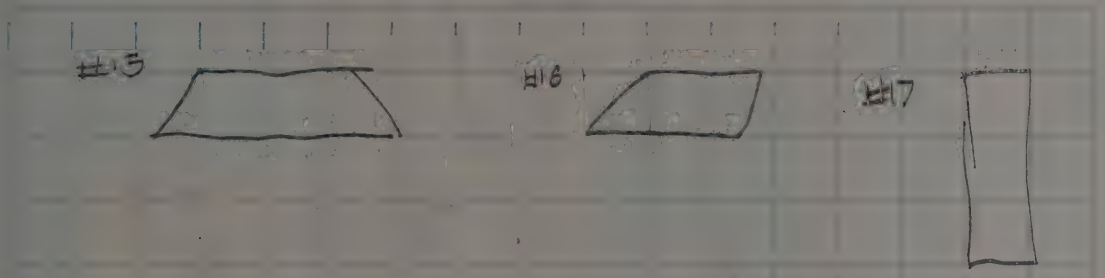
▶ Draw Quadrilaterals from a Description

Draw each figure.

15. Draw a quadrilateral that is *not* a parallelogram.

16. Draw a parallelogram that is *not* a rectangle.

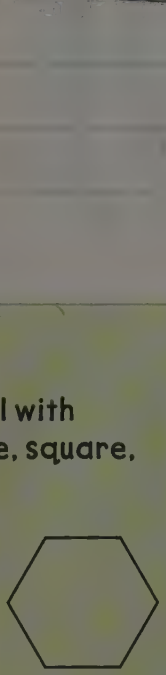
17. Draw a rectangle that is *not* a square.



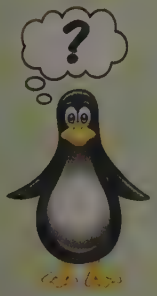
▶ What's the Error?

Dear Math Students,

Today I had to draw a quadrilateral with parallel sides that is not a rectangle, square, or rhombus. This is my drawing.



Is my drawing correct? If not, please help me understand why it is wrong.



Your friend,
Puzzled Penguin

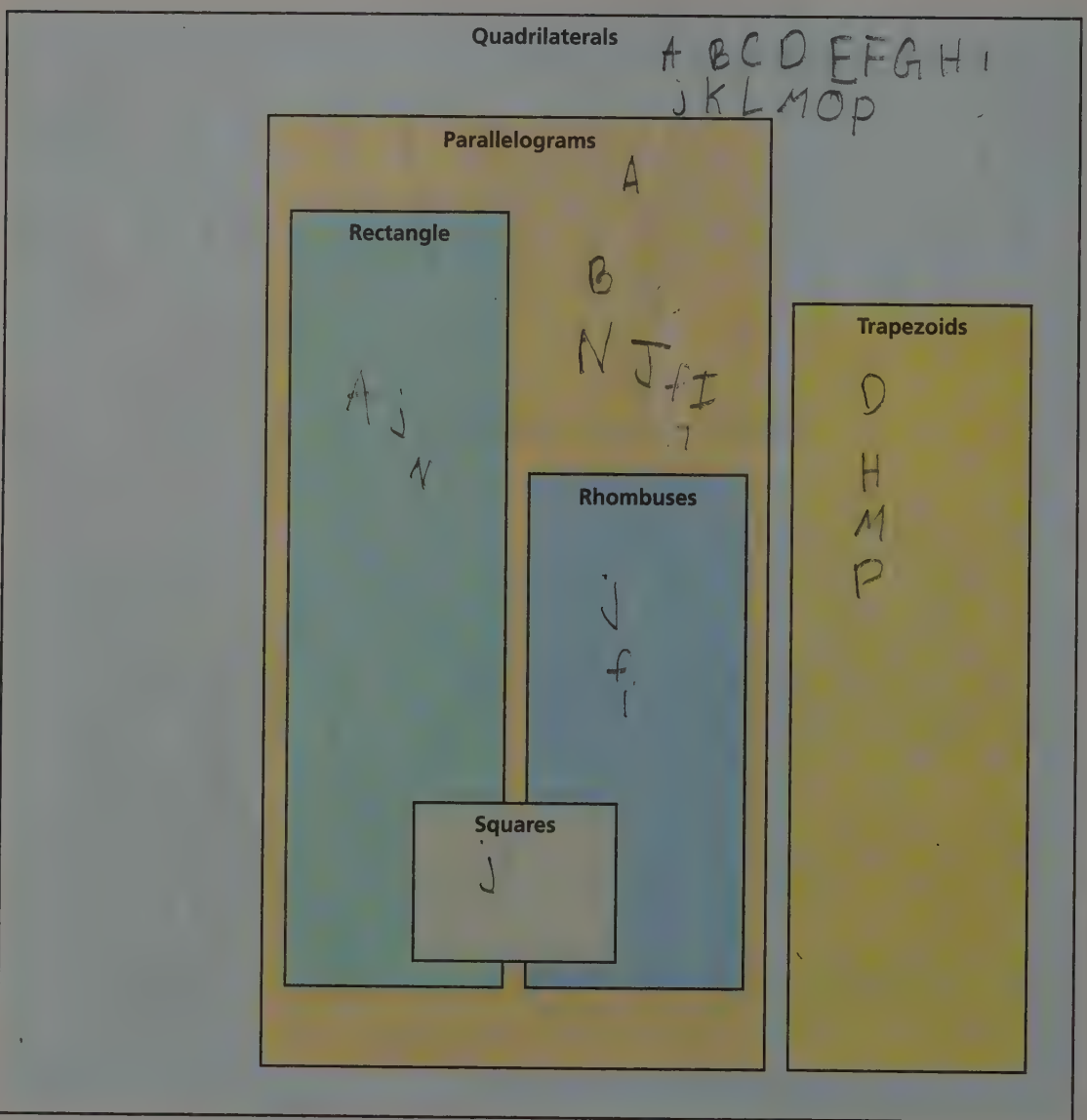
18. Write an answer to Puzzled Penguin.

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▶ Sort and Classify Quadrilaterals

Use the category diagram to sort the figures you cut out from Student Book page 333A. Write the letter of the figure in the diagram to record your work.

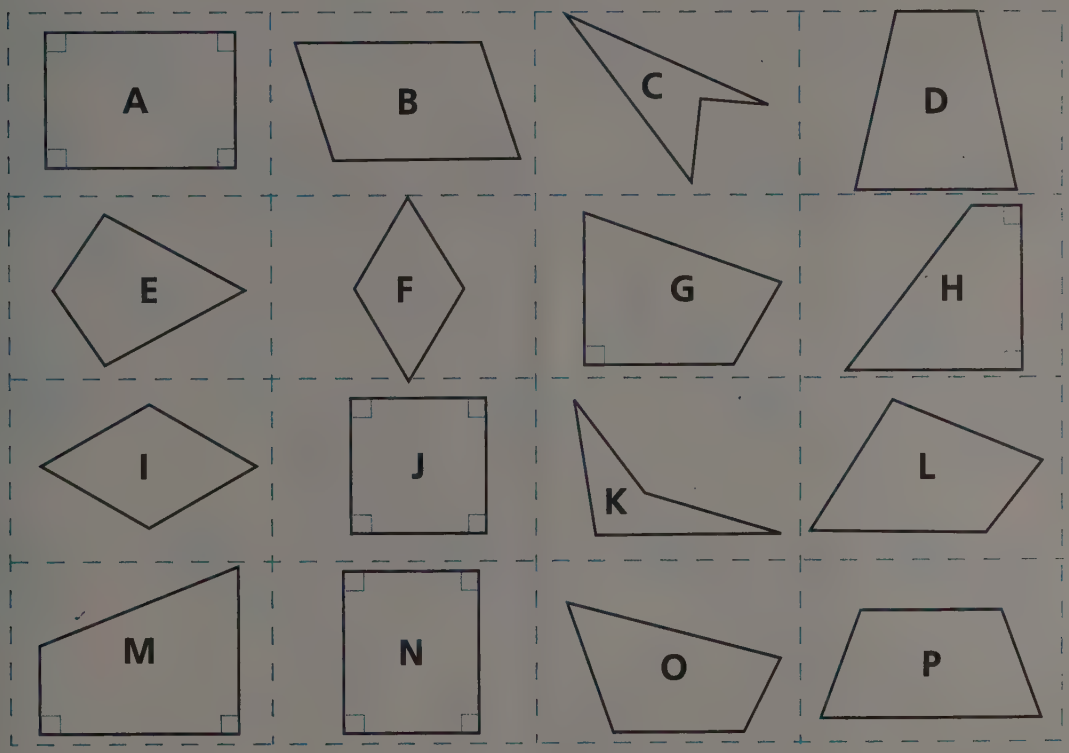


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▶ Quadrilaterals for Sorting

Cut along the dashed lines.



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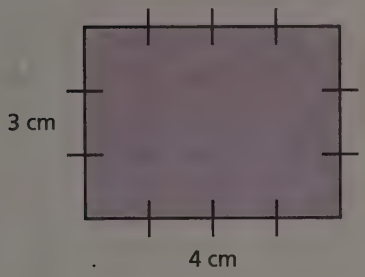
Family Letter

Content Overview

Dear Family,

Your child is currently learning about perimeter and area. Students begin to investigate the area of a rectangle by counting the number of square units inside the figure. Students also find the perimeter of a rectangle by counting linear units around the outside of the figure.

Students develop methods to find the perimeter and area of a rectangle, as shown below.

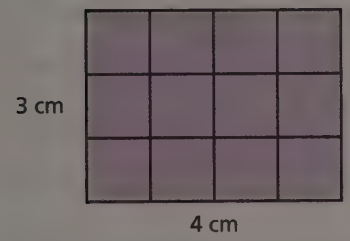


Perimeter = distance around the rectangle

Perimeter = side length + side length + side length + side length

$P = 4 \text{ cm} + 3 \text{ cm} + 4 \text{ cm} + 3 \text{ cm}$

$P = 14 \text{ cm}$



Area = square units inside the rectangle

Area = side length × side length

$A = 4 \text{ cm} \times 3 \text{ cm}$

$A = 12 \text{ sq cm}$

Students draw rectangles that have the same perimeter but different areas and rectangles that have the same area but different perimeters. They discover relationships between perimeter and area, such as that for a given area, the longest, skinniest rectangle has the greatest perimeter and the rectangle with sides closest to the same length or the same length has the least perimeter.

Students create shapes with tangrams, explore area relationships among the tangram shapes, and use the shapes as improvised units to measure area.

Throughout the unit students apply what they have learned about perimeter and area to real world problems.

If you have any questions or comments, please call or write to me.

Thank you.

Sincerely,
Your child's teacher

CA CC

Unit 6 addresses the following standards from the *Common Core State Standards for Mathematics with California Additions*: **3.G.1, 3.G.2, 3.MD.5, 3.MD.5a, 3.MD.5b, 3.MD.6, 3.MD.7, 3.MD.7a, 3.MD.7b, 3.MD.7c, 3.MD.7d, 3.MD.8,** and all Mathematical Practices.

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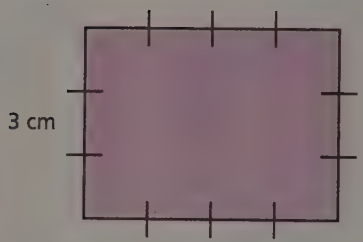
Carta a la familia

Un vistazo general al contenido

Estimada familia:

Su niño está aprendiendo acerca de perímetro y área. Los estudiantes comenzarán a investigar el área de un rectángulo contando las unidades cuadradas que caben en la figura. También hallarán el perímetro de un rectángulo contando las unidades lineales alrededor de la figura.

Los estudiantes desarrollarán métodos para hallar el perímetro y el área de un rectángulo, como se muestra a continuación.

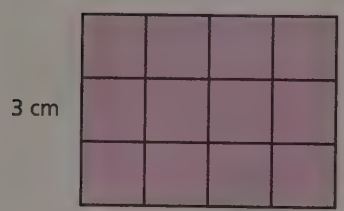


Perímetro = distancia alrededor del rectángulo

Perímetro = largo del lado + largo del lado + largo del lado + largo del lado

$P = 4 \text{ cm} + 3 \text{ cm} + 4 \text{ cm} + 3 \text{ cm}$

$P = 14 \text{ cm}$



Área = unidades cuadradas dentro del rectángulo

Área = largo del lado × largo del lado

$A = 4 \text{ cm} \times 3 \text{ cm}$

$A = 12 \text{ cm cuad}$

Los estudiantes dibujarán rectángulos con el mismo perímetro pero diferentes áreas y rectángulos con la misma área pero diferentes perímetros. Descubrirán cómo se relacionan el perímetro y el área, por ejemplo, para un área determinada, el rectángulo más largo y angosto tiene el perímetro mayor y el rectángulo con lados de igual o casi igual longitud, tiene el perímetro menor.

Los estudiantes crearán figuras con tangramas, explorarán la relación entre el área de esas figuras y las usarán como medidas improvisadas para medir área.

Durante esta unidad los estudiantes aplicarán a problemas cotidianos lo que han aprendido acerca del perímetro y el área.

Si tiene alguna duda o algún comentario, por favor comuníquese conmigo.

Atentamente,
El maestro de su niño

CA CC

En la Unidad 6 se aplican los siguientes estándares auxiliares, contenidos en los *Estándares estatales comunes de matemáticas con adiciones para California*: **3.G.1, 3.G.2, 3.MD.5, 3.MD.5a, 3.MD.5b, 3.MD.6, 3.MD.7, 3.MD.7a, 3.MD.7b, 3.MD.7c, 3.MD.7d, 3.MD.8** y todos los de prácticas matemáticas.

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6-5 Class Activity

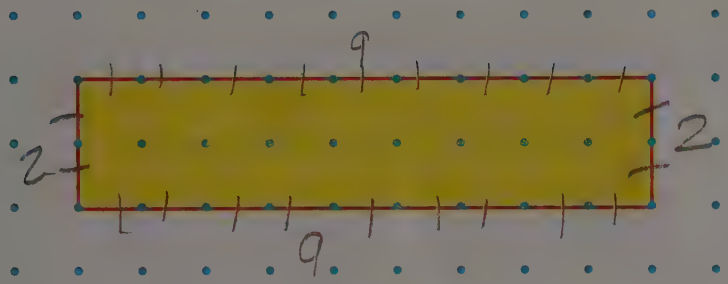
Name _____ Date _____

CA CC Content Standards 3.MD.5, 3.MD.5a, 3.MD.5b, 3.MD.6, 3.MD.7, 3.MD.7a, 3.MD.7b, 3.MD.8
Mathematical Practices MP.2, MP.5

VOCABULARY
perimeter
area
unit square

▶ Recognize Perimeter and Area

On this page, the dots on the dot paper are 1 cm apart. Use the rectangle for Exercises 1–4.



1. What part of the rectangle is its **perimeter**?

red lines

2. What part of the rectangle is its **area**?

yellow

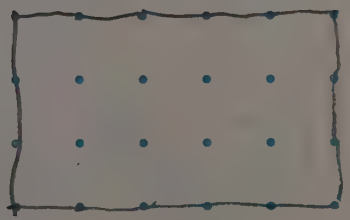
3. Find the perimeter. Draw tick marks to help.

22 cm

4. Find the area. Draw **unit squares** to help.

18 cm²

5. Draw a rectangle 5 cm long and 3 cm wide on the dot paper. Find the perimeter and area.



Perimeter 16 cm

Area 15 cm2

6. Explain how you found the area of the rectangle in Exercise 5.

multiply L X W

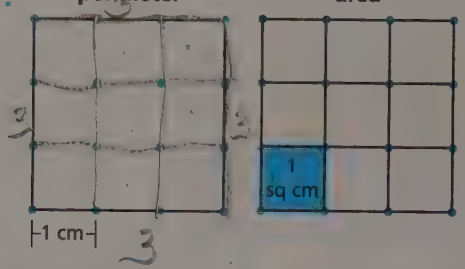
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Name _____ Date _____

Find Perimeter and Area

Find the perimeter and area of each figure.
Remember to include the correct units in your answers.

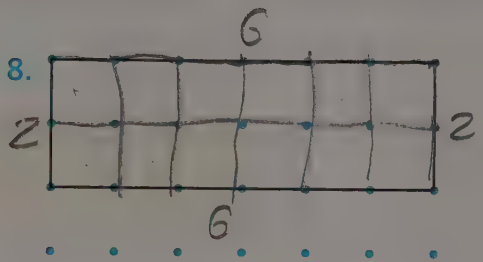
7. perimeter area



Perimeter = 12 cm

Area = 9 cm²

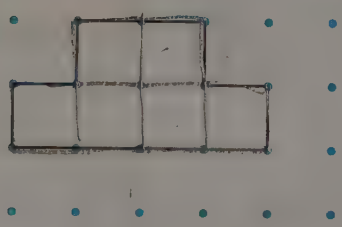
8.



Perimeter = 16 cm

Area = 12 cm²

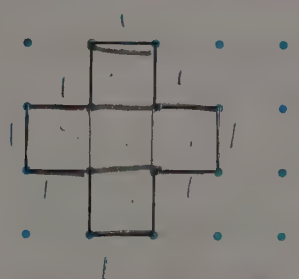
9.



Perimeter = 12 cm

Area = 6 cm²

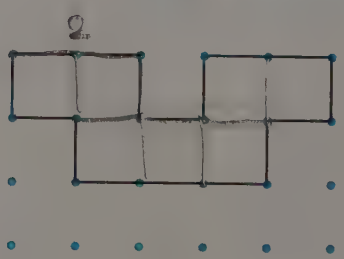
10.



Perimeter = 12 cm

Area = 5 cm²

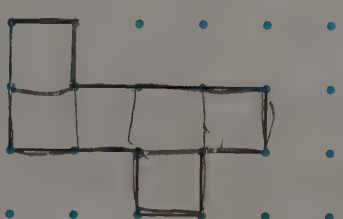
11.



Perimeter = 16 cm

Area = 7 cm²

12.



Perimeter = 14 cm

Area = 6 cm²

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6-5 Class Activity

Name _____ Date _____

▶ Tile a Rectangle

Cut out the 1-inch unit squares along the dashed lines. Try to cut as carefully and as straight as you can.



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Tile a Rectangle

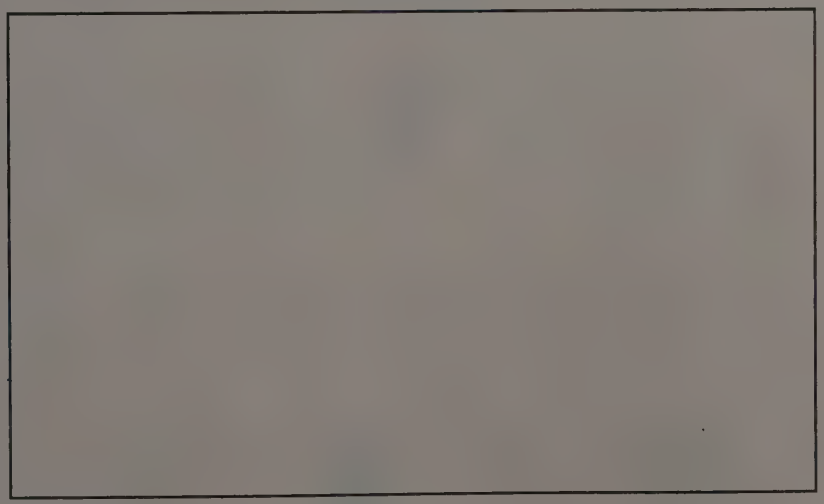
13. Use the 1-inch unit squares from page 337A to cover the rectangle below.

14. Check whether there are any gaps between the unit squares.

15. Check whether any unit squares overlap.

16. Draw lines to show the unit squares. The number of unit squares is the area in square inches. What is the area?

17. Use an inch ruler to measure the side lengths of the rectangle. Label the length and the width.



18. Write a multiplication equation to show the area.

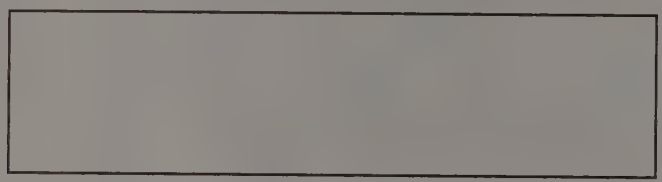
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Name _____ Date _____

▶ Tile a Rectangle (continued)

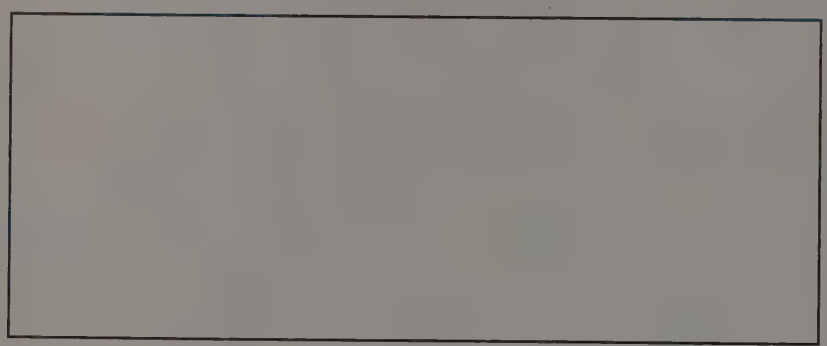
Cover each rectangle with 1-inch unit squares. Count the squares to find the area. Then write an equation to show the area.

19.



The area is _____ The equation is _____

20.



The area is _____ The equation is _____

21. How many 1-inch unit squares are needed to cover a rectangle that is 7 inches long and 4 inches wide?

22. What is the area of a rectangle that is 7 inches long and 4 inches wide?

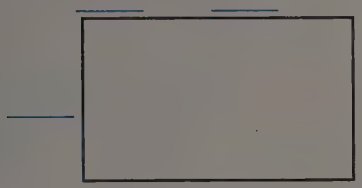
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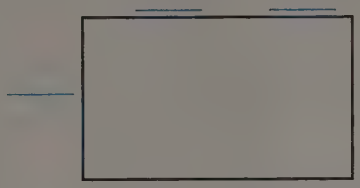
Name _____ Date _____

CA CC Content Standards 3.MD.7, 3.MD.7b, 3.MD.7c, 3.MD.7d, 3.MD.8
Mathematical Practices MP.1, MP.2, MP.4

Write Different Equations for Area

1. Use the drawings. Show two ways to find the area of a rectangle that is 10 units long and 6 units wide.





2. Write equations for your two rectangle drawings.

_____ _____

3. Suppose the rectangle is 10 feet long and 6 feet wide. What is its area?

4. Suppose the rectangle is 10 meters long and 6 meters wide. What is its area?

5. Use drawings and write equations to show two ways to find the area of a rectangle that is 9 yards long and 5 yards wide.

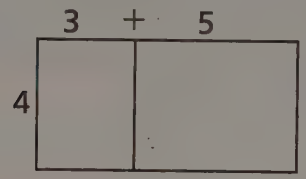
_____ _____

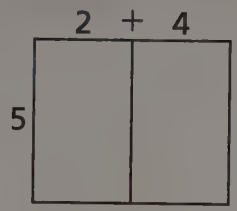
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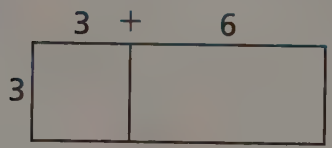
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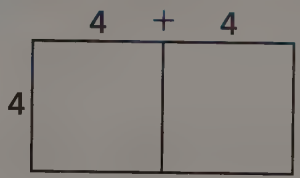
▶ Rectangle Equations and Drawings

Write an equation for each rectangle.

6. 

7. 

8. 

9. 

Draw a rectangle for each equation.

10. $(3 \times 3) + (3 \times 5) = 3 \times 8$

11. $(4 \times 5) + (4 \times 3) = 4 \times 8$

12. $(5 \times 3) + (5 \times 6) = 5 \times 9$

13. $(4 \times 6) + (4 \times 4) = 4 \times 10$

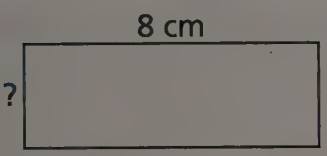
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Name _____ Date _____

▶ Find Unknown Side Lengths

Find the unknown side length in each diagram.

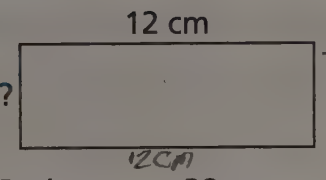
14.



Area = 72 sq cm

72÷8=9cm²

15.

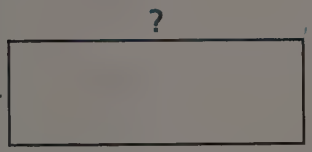


12 cm + 12 = 14

Perimeter = 38 cm

14÷2=7

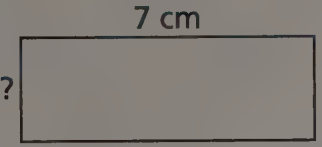
16.



Perimeter = 64 cm

16÷2=8cm

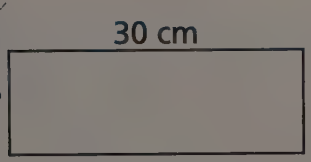
17.



Area = 56 sq cm

56÷7=8cm²

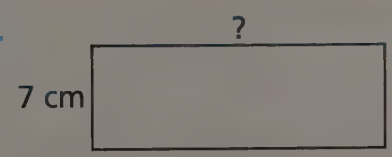
18.



Perimeter = 72 cm

12÷2=6cm

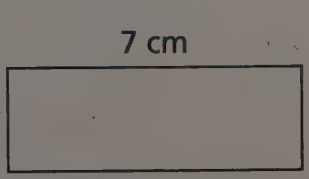
19.



Area = 63 sq cm

63÷7=9cm²

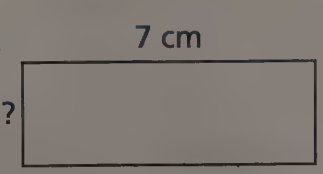
20.



Area = 28 sq cm

28÷7=4cm²

21.



Perimeter = 28 cm

28÷7=4cm

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Name _____ Date _____

▶ Unknown Side Length Problems

Solve. Draw a rectangle to represent the situation. *Show your work.*

22. Alexander and his grandfather are tiling their rectangular kitchen floor. They need to use 42 tiles. They are making rows of 7 tiles. How many rows do they make?

23. Tilly and her mom made a rectangular dog run. They used 12 one-yard long pieces of fencing. They put 2 pieces of fencing on one side. How many pieces did they put on the next side?

24. Martha is making a quilt. She has 63 squares ready to sew together. She wants the quilt to be 9 rows long. How many squares will be in each row?

25. Rick and Roger are painting a mural made up of different sizes of rectangles, with no gaps or overlaps of the rectangles. They have enough paint to cover 15 square yards. They want the mural to be 3 yards long. How wide can the mural be?

26. Mr. Baker wants to use all of a 48-inch strip of oak trim for a box he plans to make. He wants the box to be 14 inches wide. How long will the box be?

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6-7 Class Activity

Name _____ Date _____

CA CC Content Standards 3.MD.7b, 3.MD.8
Mathematical Practices MP.2, MP.8

▶ Compare Rectangles with the Same Perimeter

Complete.

1. On a centimeter dot grid, draw all possible rectangles with a perimeter of 12 cm and sides whose lengths are whole centimeters. Label the lengths of two adjacent sides of each rectangle.

2. Find and label the area of each rectangle. In the table, record the lengths of the adjacent sides and the area of each rectangle.

3. Compare the shapes of the rectangles with the least and greatest areas.

Rectangles with Perimeter 12 cm	
Lengths of Two Adjacent Sides	Area
4 × 4 =	8 cm²
6 × 6 =	12 cm²
9 × 8 =	72 cm²

4. On a centimeter dot grid, draw all possible rectangles with a perimeter of 22 cm and sides whose lengths are whole centimeters. Label the lengths of two adjacent sides of each rectangle.

5. Find and label the area of each rectangle. In the table, record the lengths of the adjacent sides and the area of each rectangle.

Rectangles with Perimeter 22 cm	
Lengths of Two Adjacent Sides	Area
2 × 2 =	4 cm²
4 × 5 =	20 cm²
2 × 8 =	16 cm²
8 × 3 =	24 cm²
9 × 2 =	18 cm²

6. Compare the shapes of the rectangles with the least and greatest areas.

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Name _____ Date _____

▶ Compare Rectangles with the Same Area

Complete.

7. On a centimeter dot grid, draw all possible rectangles with an area of 12 sq cm and sides whose lengths are whole centimeters. Label the lengths of two adjacent sides of each rectangle.

8. Find and label the perimeter of each rectangle. In the table, record the lengths of the adjacent sides and the perimeter of each rectangle.

9. Compare the shapes of the rectangles with the least and greatest perimeter.

Rectangles with Area 12 sq cm	
Lengths of Two Adjacent Sides	Perimeter
2X6 =	12cm
12X1 =	12cm
6X3 =	18cm

10. On a centimeter dot grid, draw all possible rectangles with an area of 18 sq cm and sides whose lengths are whole centimeters. Label the lengths of two adjacent sides of each rectangle.

11. Find and label the perimeter of each rectangle. In the table, record the lengths of the adjacent sides and the perimeter of each rectangle.

12. Compare the shapes of the rectangles with the least and greatest perimeter.

Rectangles with Area 18 sq cm	
Lengths of Two Adjacent Sides	Perimeter

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6-8 Class Activity

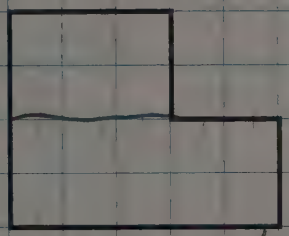
Name _____ Date _____

CA CC Content Standards 3.MD.7d
Mathematical Practices MP.3, MP.6, MP.7

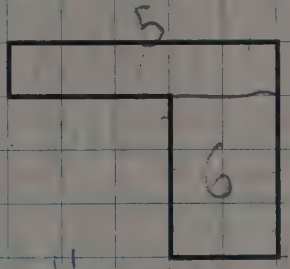
VOCABULARY
decompose

▶ Find Area by Decomposing into Rectangles

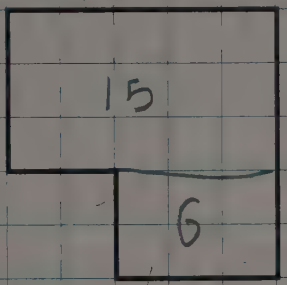
Decompose each figure into rectangles. Then find the area of the figure.

1. 

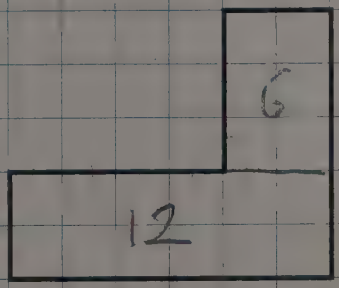
16 sq. units

2. 

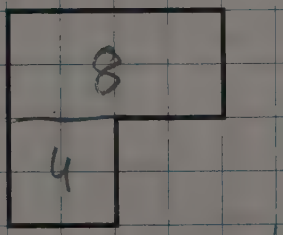
24 sq units

3. 

21 sq. units

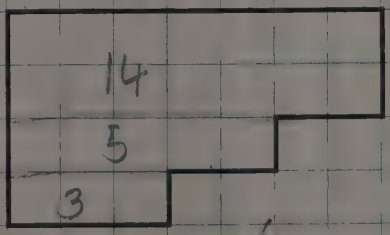
4. 

18 sq units

5. 

32 sq units

14
+ 5
3
2

6. 

22 sq units

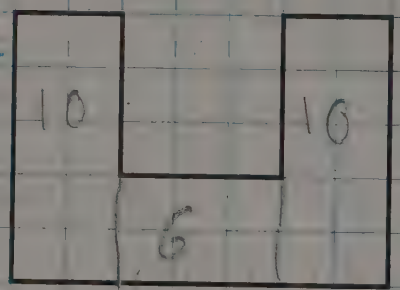
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Name _____ Date _____

▶ Find Area by Decomposing into Rectangles (continued)

Decompose each figure into rectangles. Then find the area of the figure.

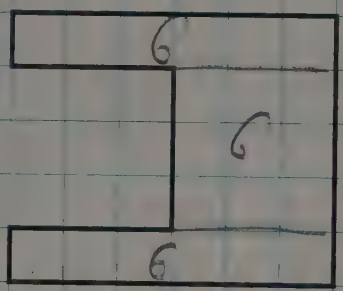
7.



10
10
+ 6
26

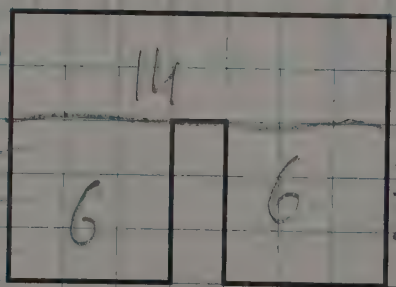
26 sq. units

8.



28 sq units

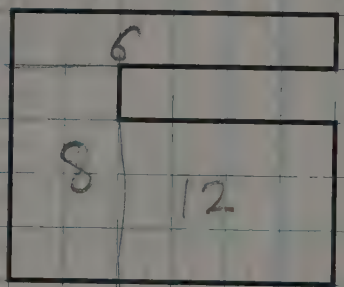
9.



14
6
+ 6
26

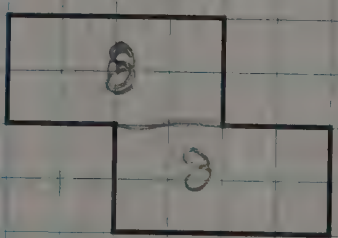
26 sq units

10.



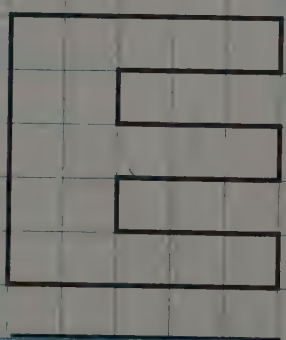
12
+ 8
6

11.



64 sq. units

12.

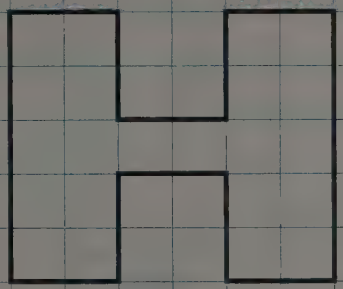


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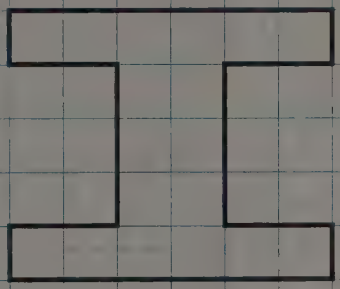
Name _____ Date _____

▶ Find Area by Decomposing into Rectangles (continued)

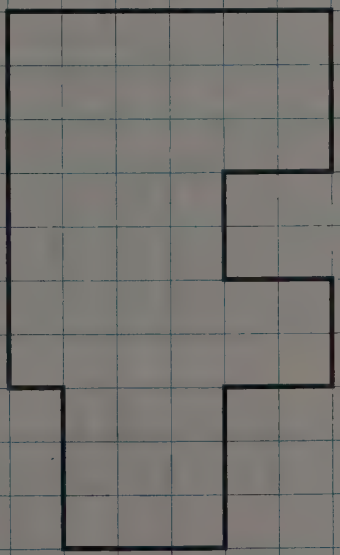
Decompose each figure into rectangles. Then find the area of the figure.

13. 

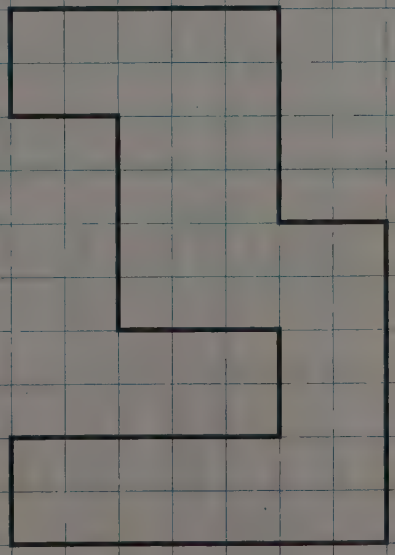
22 sq. units

14. 

18

15. 

56

16. 

44

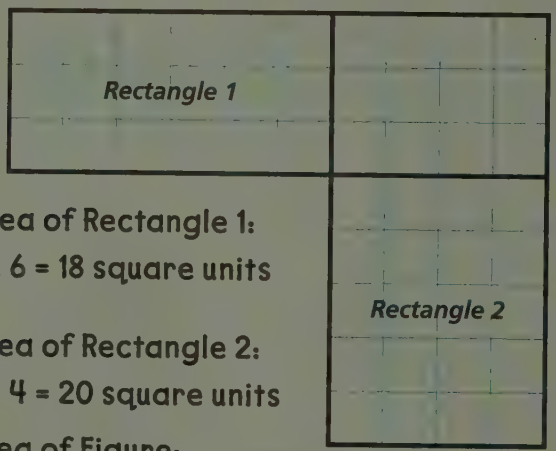
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Name _____ Date _____

What's the Error?

Dear Math Students,

Today my teacher asked me to find the area of a figure. I knew that I could decompose the figure into rectangles. This is what I did.



Area of Rectangle 1:
3 x 6 = 18 square units

Area of Rectangle 2:
5 x 4 = 20 square units

Area of Figure:
18 + 20 = 38 square units



Is my work correct? If not, please correct my work and tell me what I did wrong. How do you know my answer is wrong?

Your friend,
Puzzled Penguin

17. Write an answer to Puzzled Penguin.

No you are wrong because you should add them all up then you get the corrrot answer.

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6-9 Class Activity

Name _____ Date _____

CA CC Content Standards 3.MD.7b, 3.MD.8
Mathematical Practices MP.1, MP.4

▶ Solve Perimeter and Area Problems

Solve. Circle whether you need to find a perimeter, an area, or an unknown side length. Draw a diagram to represent each situation.

Show your work.

1. The dimensions of a rectangular picture frame are 9 inches and 6 inches. What is the area of a picture that would fit in the frame?



Perimeter (Area) Side Length

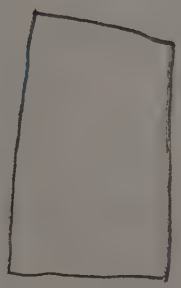
9x6 =56 squar in

2. A garden has the shape of a hexagon. Each side of the garden is 5 feet long. How much fence is needed to go around the garden?

(Perimeter) Area Side Length

5x6=30 sq. in.

3. The length of a water slide is 9 yards. The slide is 2 yards wide. How much of the surface of the slide must be covered with water?



Perimeter (Area) Side Length

9x2=18 squar in.

4. Mr. Schmidt is installing 32 cubbies in the hallway. He puts 8 cubbies in each row. How many rows of cubbies can he make?

Perimeter (Area) Side Length

32÷8=4 squar in.

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Name _____ Date _____

▶ Solve Perimeter and Area Problems (continued)

Solve. Circle whether you need to find a perimeter, an area, or an unknown side length. Draw a diagram to represent each situation.

Show your work.

5. The floor of a delivery van has an area of 56 square feet and is 8 feet long. How many rows of 8 boxes that measure 1 foot by 1 foot can be put in the delivery van?

Perimeter Area (Side Length)

56÷8=7 sq. in.

6. Zack is planning to make a flower garden. He has 24 one-yard sections of fence that he plans to place around the garden. He wants the garden to be as long as possible. What is the longest length he can use for the garden? How wide will the garden be?

Perimeter (Area) Side Length

24X1=24 sq. in.

7. A spa is 9 yards long and 7 yards wide. A locker room 8 yards long and 6 yards wide is at one end of the spa. How much floor space do the spa and the locker room take up?

Perimeter (Area) Side Length

9X7=63 8X6=42 165 floors space

8. Rosa's dog Sparky is 24 inches long. One side of Sparky's doghouse is 36 inches long and the other side is twice as long as Sparky. What is the distance around Sparky's doghouse?

Perimeter Area (Side Length)

24+24=48 sq. in

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▶ Solve Perimeter and Area Problems (continued)

Solve. Circle whether you need to find a perimeter, an area, or an unknown side length. Draw a diagram to represent each situation. Show your work.

9. Joanne made 16 fruit bars in a square pan. The fruit bars are 2 inches by 2 inches. What are the dimensions of the pan she used to bake the fruit bars?

Perimeter Area (Side Length)

16÷2=8 sq. in.

10. A scout troop is making triangular pennants for their tents. Two sides of each pennant are 2 feet long and the third side is 1 foot long. How much binding tape is needed to go around 4 pennants?

(Perimeter) Area Side Length

2x2x1=4 4x4=16 foot long

11. A rectangular quilt is 5 feet wide and 7 feet long. How many feet of lace are needed to cover the edges of the quilt?

Perimeter (Area) Side Length

7x5=35 feet

12. Amy has a piece of fleece fabric that is 4 feet wide and 6 feet long. How many squares of fleece fabric that are 1 foot wide and 1 foot long can she cut from the fabric?

Perimeter (Area) Side Length

6x4=24 feet long

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Name _____ Date _____

▶ Solve Perimeter and Area Problems (continued)

Solve. Circle whether you need to find a perimeter, an area, or an unknown side length. Draw a diagram to represent each situation.

Show your work.

13. Leighanne has 23 tiles with dimensions of 1 foot by 1 foot. She wants to tile a hallway that is 8 feet long and 3 feet wide. Does she have enough tiles? If not, how many more does she need?

Perimeter (Area) Side Length

8 x 3 = 24 tiles

14. Mrs. Brown has 48 one-foot pieces of garden fence for her new vegetable garden. She wants to have as much room as possible to plant the vegetables. What dimensions should she use for the garden?

(Perimeter) Area Side Length

48 : 6 = 8

15. Martha has 27 quilt patches with animals and 27 patches with flowers. She wants her quilt to have rows of 6 patches. How many rows will the quilt have?

Perimeter (Area) Side Length

54 : 6 = 9 rows

16. A park in the shape of a triangle has a 20-mile bike path going along the sides. Donald rode 6 miles on the first side and 8 miles on the second side. How long is the third side of the park?

Perimeter (Area) Side Length

6 more miles

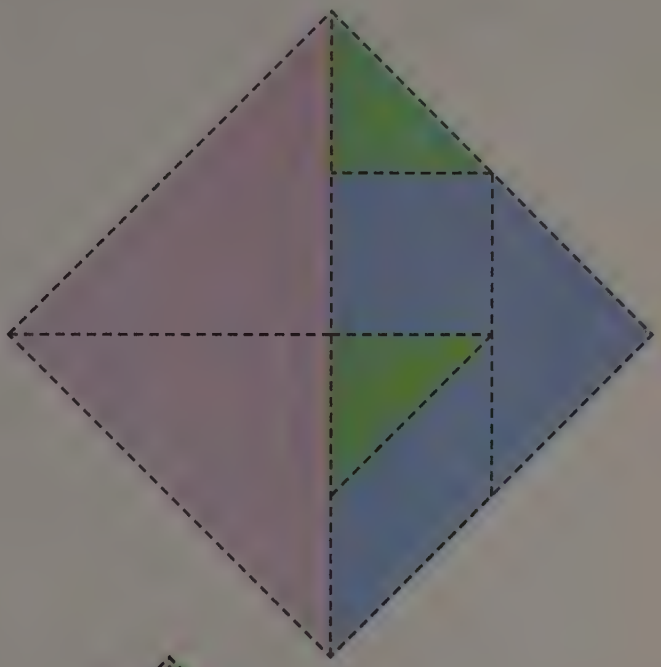
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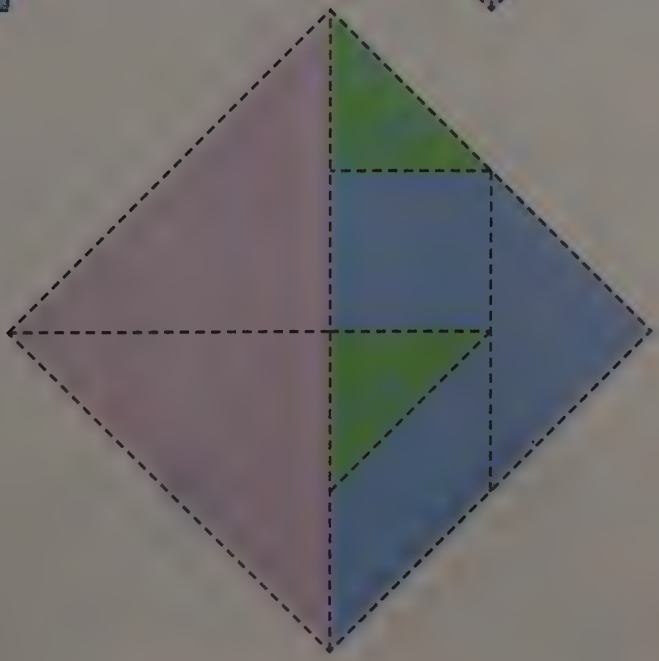
▶ Explore Tangrams

Cut one tangram figure into pieces along the dotted lines. Try to cut as carefully and as straight as you can. Save the other figures to use later.





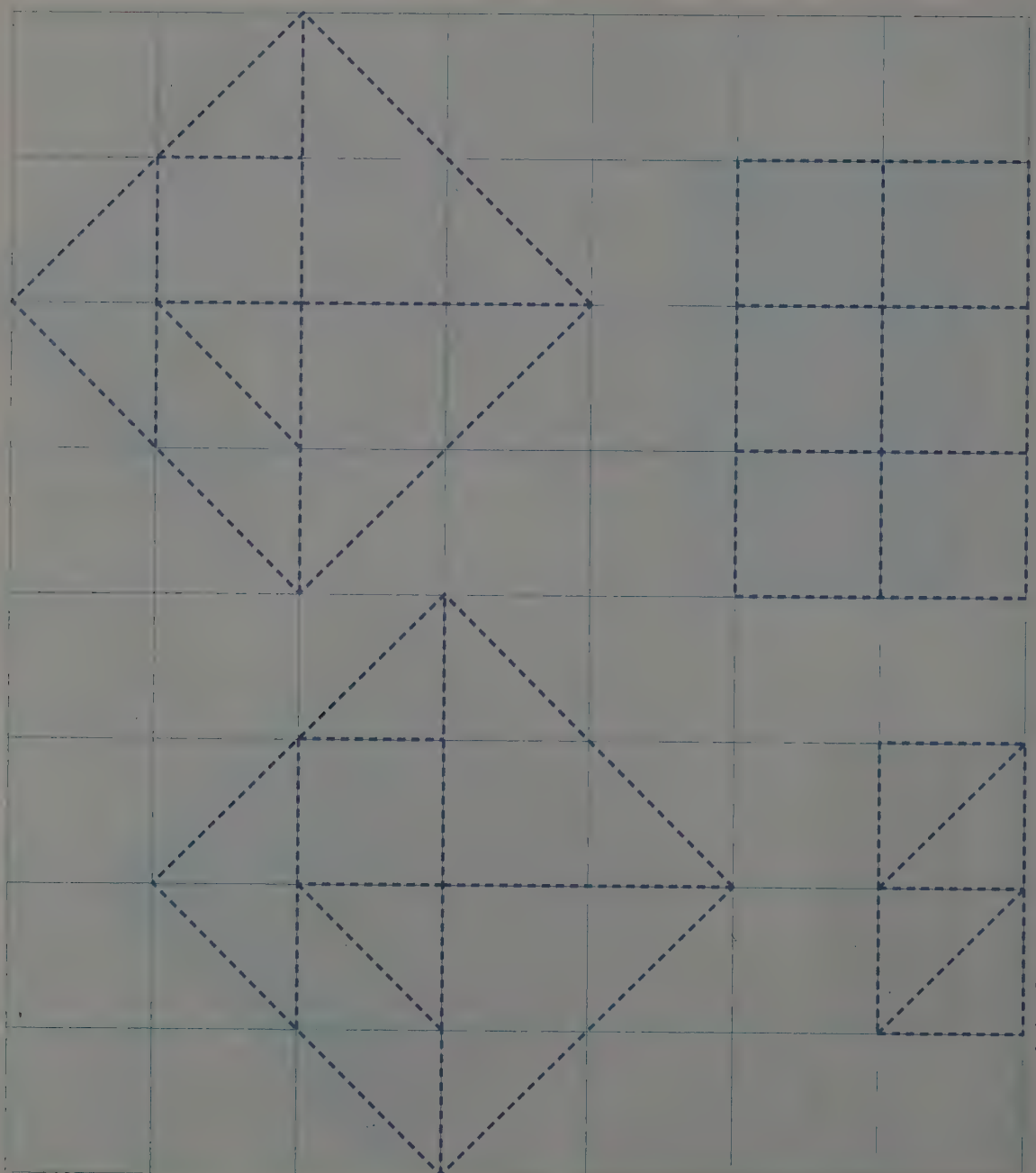




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▶ Explore Tangrams (continued)



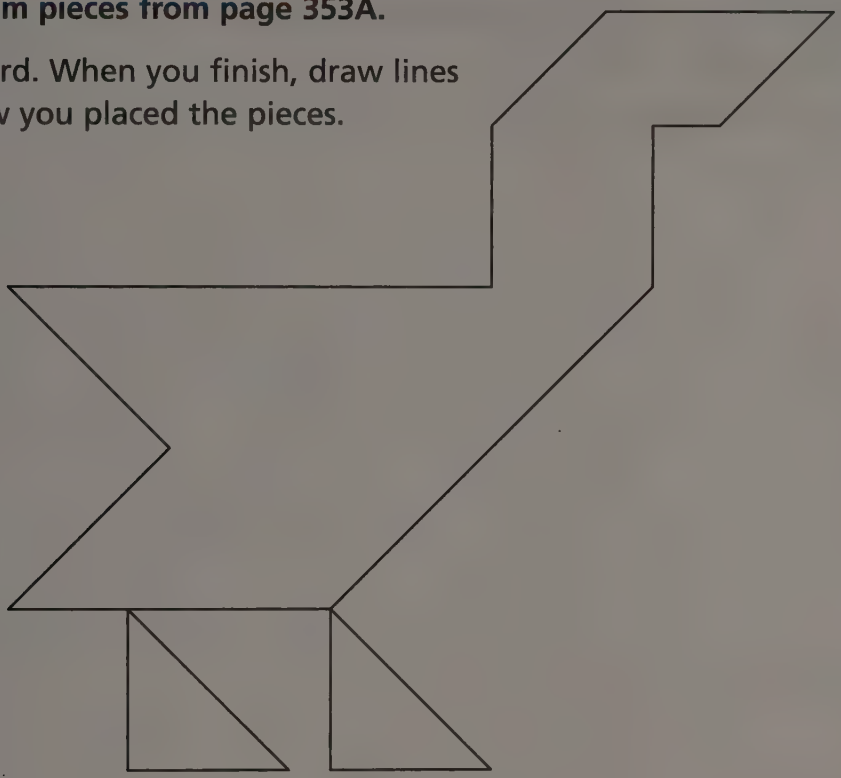
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Content Standards 3.MD.6
Mathematical Practices MP.7

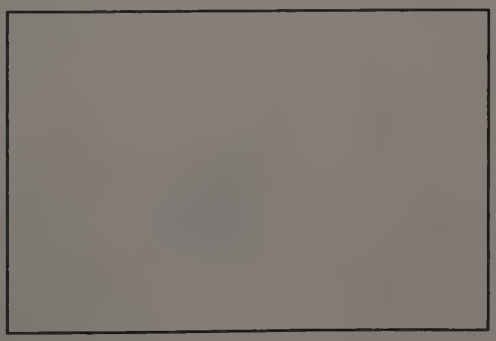
▶ Solve Tangram Puzzles

Use the tangram pieces from page 353A.

1. Make this bird. When you finish, draw lines to show how you placed the pieces.



2. Make this rectangle. Draw lines to show how you placed the pieces. Hint: You do not need all the pieces.



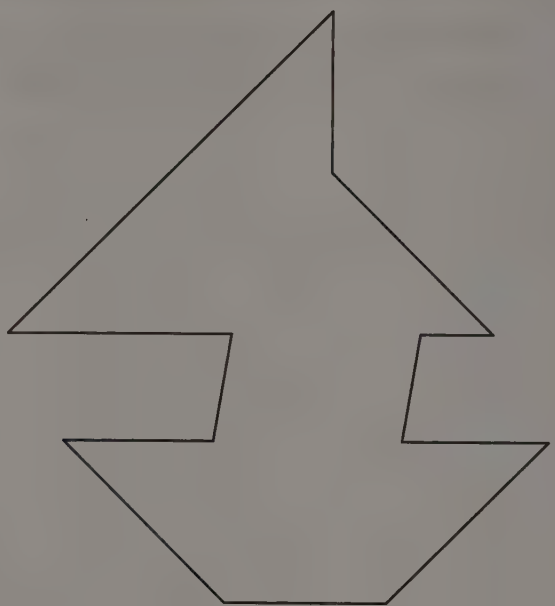
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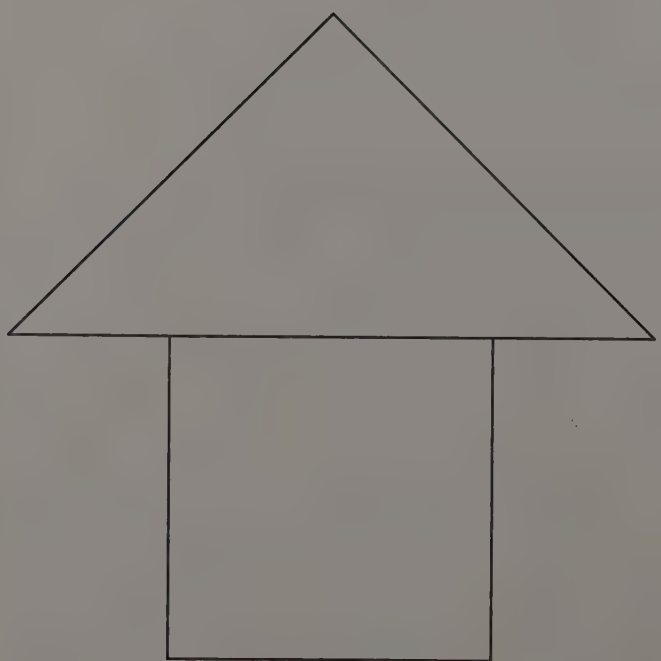
▶ Solve Tangram Puzzles (continued)

Use the tangram pieces. Draw lines to show how you placed the pieces.

3. Make this boat.



4. Make this tree.

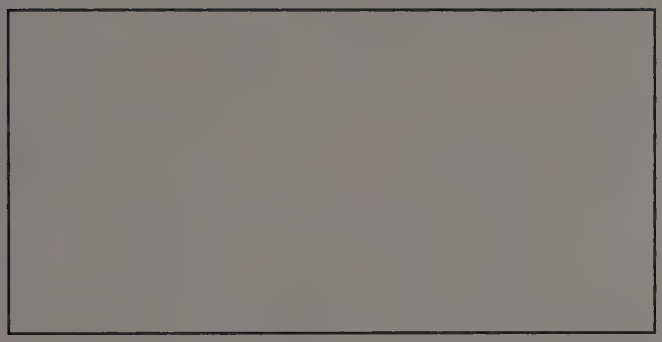


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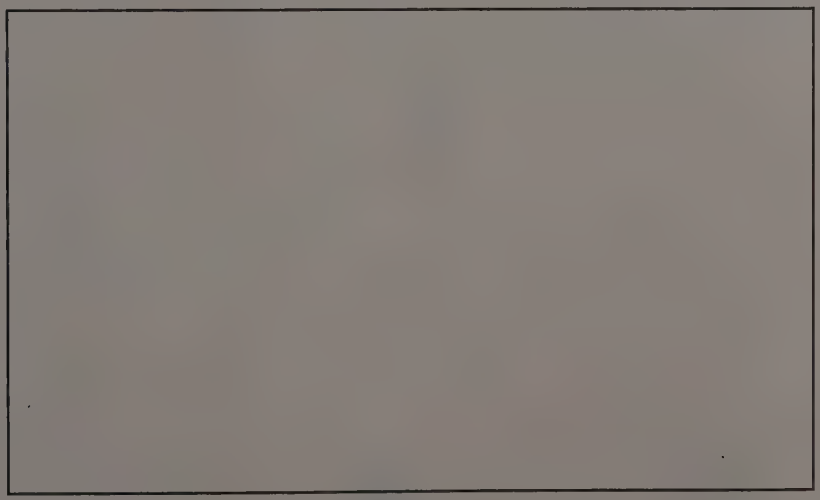
▶ Use Tangram Pieces to Find Area

5. Use the seven tangram pieces. Cover this rectangle.



6. What is the area of the rectangle?

7. Use any tangram pieces. Cover this rectangle.



8. What is the area of the rectangle?

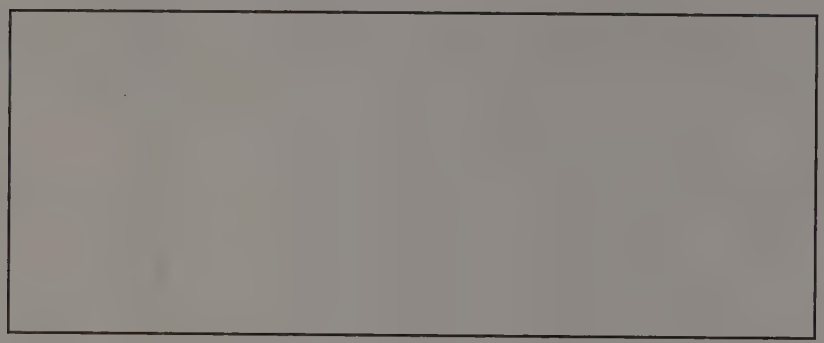
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Name _____ Date _____

▶ Use Tangram Pieces to Find Area (continued)

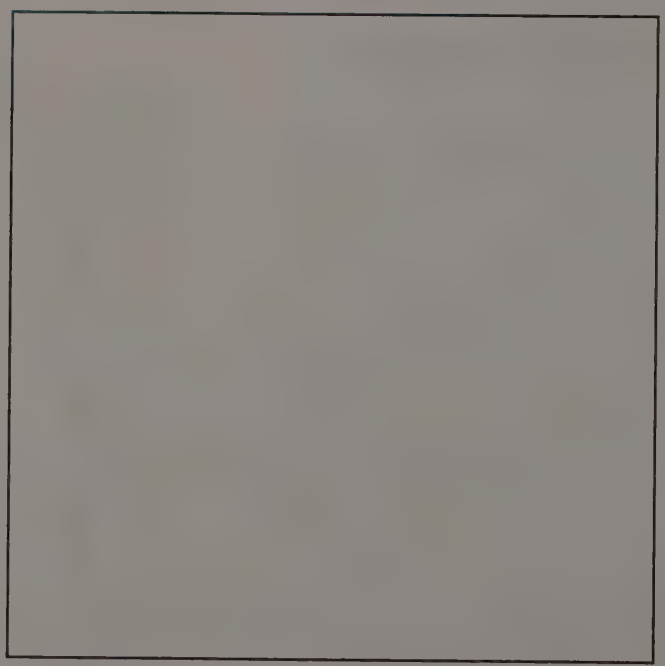
Use any tangram pieces. Cover each rectangle.

9.



What is the area of the rectangle?

10.



What is the area of the square?

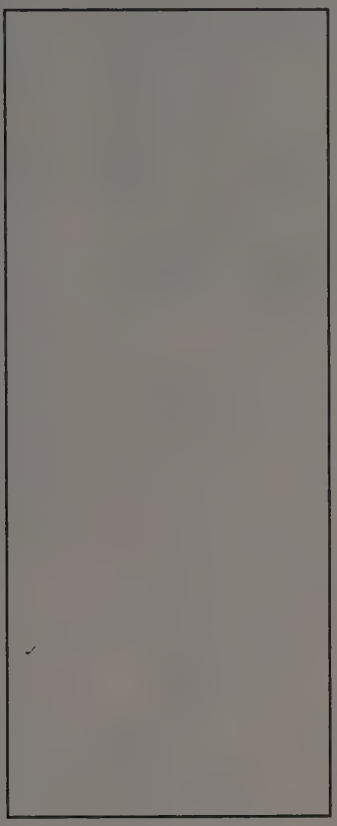
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▶ Use Tangram Pieces to Find Area (continued)

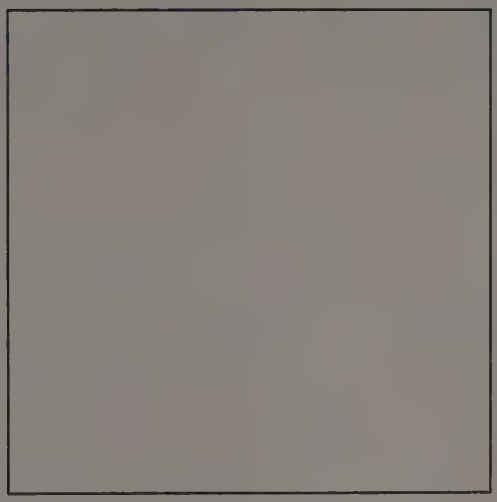
Use any tangram pieces. Cover each figure.

11.



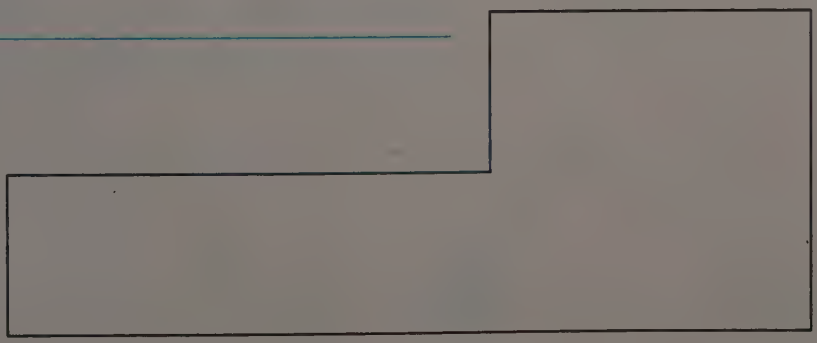
What is the area of the rectangle?

12.



What is the area of the square?

13.



What is the area of the figure?

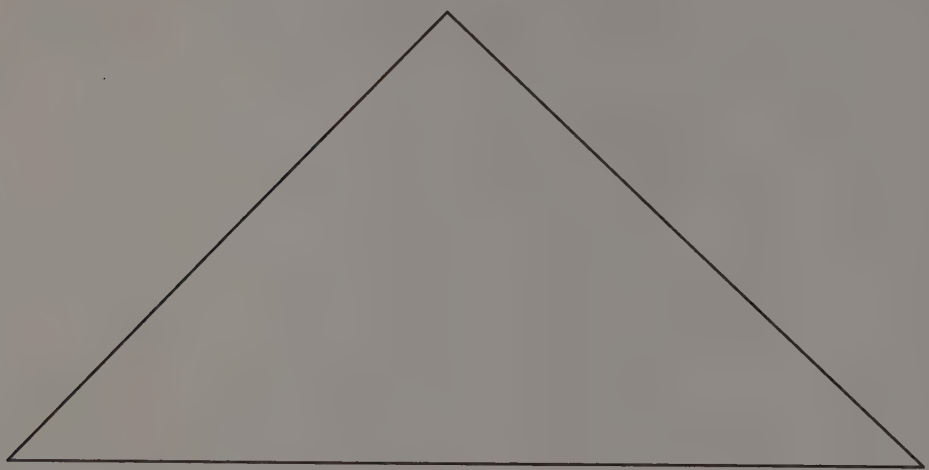
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▶ Use Tangram Pieces to Find Area (continued)

Use any tangram pieces. Cover each figure.

14.



What is the area of the triangle?

15.



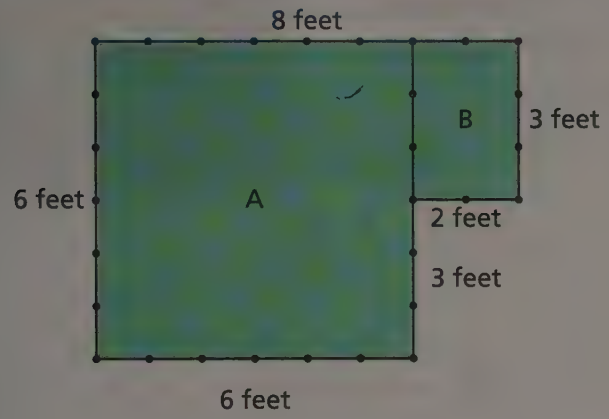
What is the area of the figure?

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CA CC Content Standards 3.MD.7d, 3.MD.8
Mathematical Practices MP.1, MP.2, MP.4

▶ Math and Gardening



Look at the drawing of Yoakim's garden.
It is divided into two quadrilaterals.

1. What is the perimeter of part A? 24 ft

 What is the perimeter of part B? 10 ft

2. What is the perimeter of the combined garden? 28 ft

3. Will Yoakim need more fencing to enclose the two parts of his garden separately or to enclose the combined garden?

 He will need more if so great

4. What is the area of part A? 36 sq. ft

 What is the area of part B? 6 sq. ft.

5. What is the area of the combined garden?

 42 sq. ft.

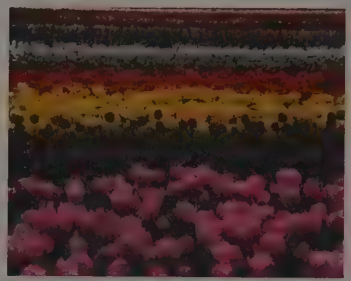
6. How does the total area of the two parts of the garden compare to the area of the combined garden?

 They are equal.

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Design a Garden



Use the dot paper below to draw a different garden that has the same perimeter as Yoakim's combined garden. Beside it, draw a different garden that has the same area as Yoakim's garden.

1 ft

7. What is the area of your garden that has the same perimeter as Yoakim's garden?

8. What is the perimeter of your garden that has the same area as Yoakim's garden?

9. Use the centimeter dot paper at the right to draw separate areas within a garden where you would plant corn, beans, and tomatoes.

The area for corn is 12 square feet.
The area for beans is 25 square feet.
The area for tomatoes is 20 square feet.

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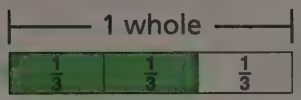
Family Letter

Content Overview

Dear Family,

In this unit, your child will be introduced to fractions. Students will build fractions from unit fractions and explore fractions as parts of a whole.

Unit Fraction



$$\frac{1}{3} + \frac{1}{3} = \frac{2}{3}$$

Fraction of a Whole



$\frac{3}{4}$ ← numerator
$\frac{3}{4}$ ← denominator

Students will find equivalent fractions, and compare fractions with either the same denominator or the same numerator.



$$\frac{1}{2} = \frac{3}{6}$$

$$\frac{1}{2} > \frac{1}{6}$$

$$\frac{2}{4} < \frac{3}{4}$$

In this unit, your child will also solve real world problems using his or her understanding of fraction concepts.

Please call if you have any questions or comments.

Sincerely,
Your child's teacher

CA CC

Unit 7 addresses the following standards from the *Common Core State Standards for Mathematics with California Additions*: **3.NF.1, 3.NF.2, 3.NF.2a, 3.NF.2b, 3.NF.3, 3.NF.3a, 3.NF.3b, 3.NF.3c, 3.NF.3d, 3.G.2,** and for all Mathematical Practices.

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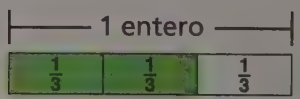
Carta a la familia

Un vistazo general al contenido

Estimada familia:

En esta unidad, se le presentarán por primera vez las fracciones a su niño. Los estudiantes formarán fracciones con fracciones unitarias y explorarán las fracciones como partes de un entero.

Fracción unitaria



$$\frac{1}{3} + \frac{1}{3} = \frac{2}{3}$$

Fracción de un entero



$\frac{3}{4}$ ← numerador
$\frac{3}{4}$ ← denominador

Los estudiantes hallarán fracciones equivalentes y compararán fracciones del mismo denominador o del mismo numerador.



$$\frac{1}{2} = \frac{3}{6}$$

$$\frac{1}{2} > \frac{1}{6}$$

$$\frac{2}{4} < \frac{3}{4}$$

En esta unidad, su niño también resolverá problemas cotidianos usando los conceptos que aprenda sobre fracciones.

Si tiene alguna duda o algún comentario, por favor comuníquese conmigo.

Atentamente,
El maestro de su niño

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CA CC

En la Unidad 7 se aplican los siguientes estándares auxiliares, contenidos en los *Estándares estatales comunes de matemáticas con adiciones para California*: **3.NF.1, 3.NF.2, 3.NF.2a, 3.NF.2b, 3.NF.3, 3.NF.3a, 3.NF.3b, 3.NF.3c, 3.NF.3d, 3.G.2** y todos los de prácticas matemáticas.

7-1 Class Activity

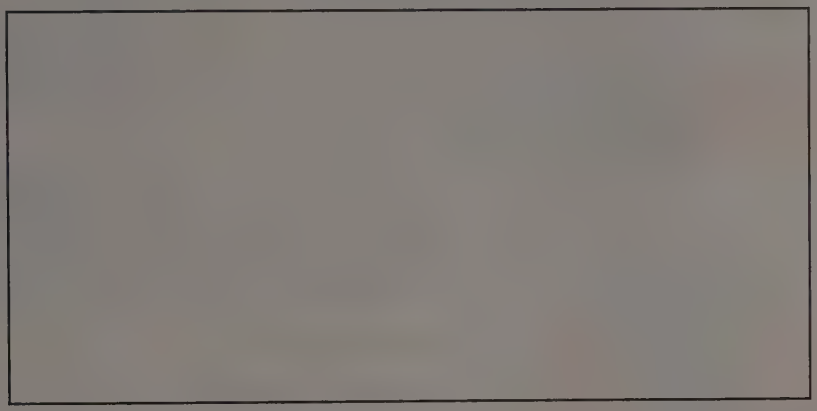
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CA CC Content Standards 3.NF.1, 3.G.2
Mathematical Practices MP.2, MP.7

▶ Explore Unit Fractions

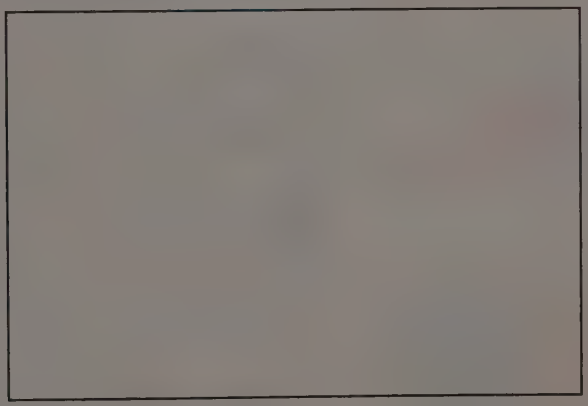
Use your rectangles from page 369A to make the whole shape. Count the equal parts. What unit fraction of the whole shape is one of the rectangles?

1.



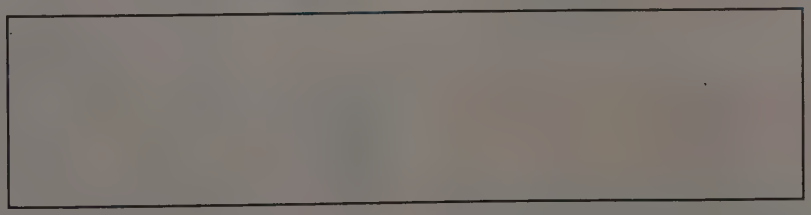
Number of equal parts 4 Unit fraction $\frac{1}{4}$

2.



Number of equal parts 3 Unit fraction $\frac{1}{3}$

3.



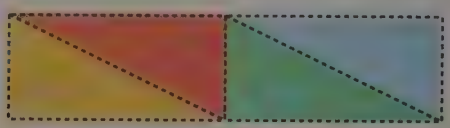
Number of equal parts 2 Unit fraction $\frac{1}{2}$

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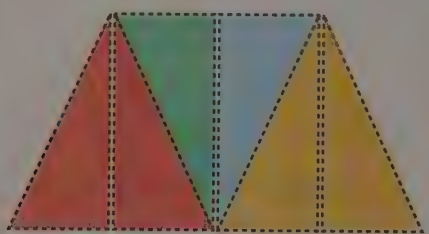
▶ Explore Unit Fractions (continued)

Use your triangles from page 369A to make a whole shape like the model shown. Count the equal parts in the whole. What unit fraction of the whole shape is the blue triangle?

4. 

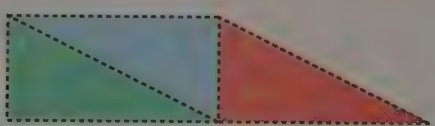
There are 4 equal parts in the whole shape.

The blue triangle is $\frac{1}{4}$ of the whole shape.

5. 

There are 6 equal parts in the whole shape.

The blue triangle is $\frac{1}{6}$ of the whole shape.

6. 

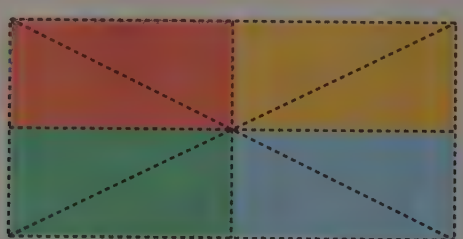
There are 3 equal parts in the whole shape.

The blue triangle is $\frac{1}{3}$ of the whole shape.

7. 

There are 5 equal parts in the whole shape.

The blue triangle is $\frac{1}{5}$ of the whole shape.

8. 

There are 8 equal parts in the whole shape.

One blue triangle is $\frac{1}{8}$ of the whole shape.

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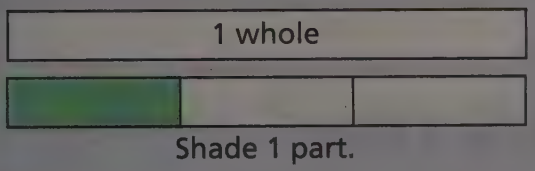
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VOCABULARY

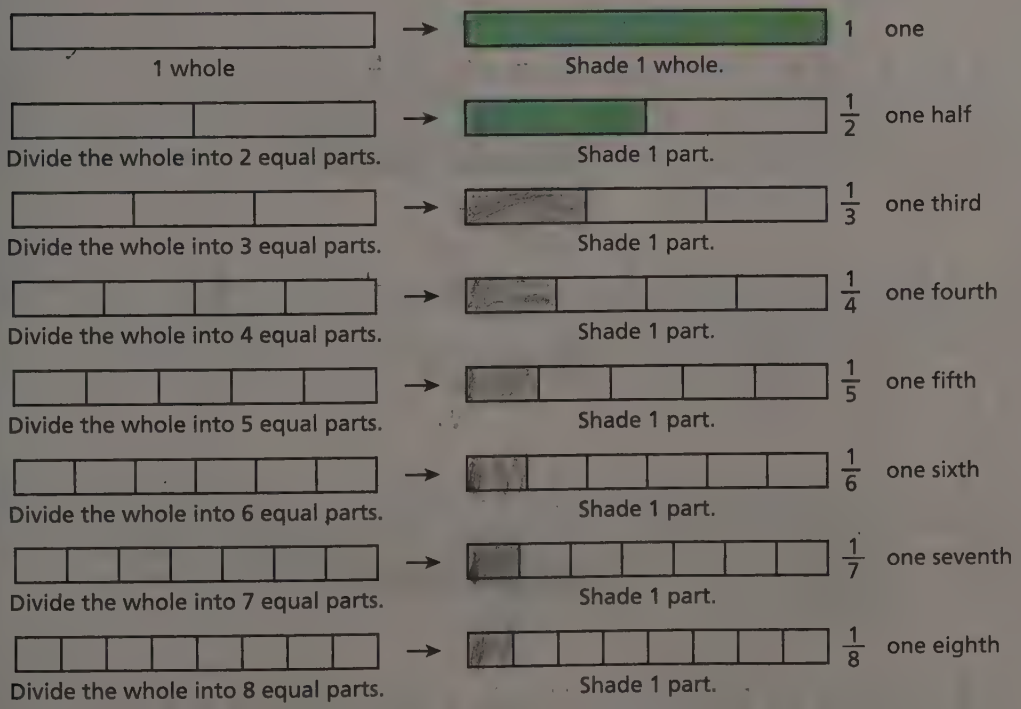
fraction denominator
numerator unit fraction

▶ Unit Fractions and Fraction Bars

You can represent a **fraction** with a fraction bar. The **denominator** tells how many equal parts the whole is divided into. The **numerator** tells how many equal parts you are talking about.



A **unit fraction** has a numerator of 1. Shade the rest of the fraction bars at the right below to represent unit fractions. What patterns do you see?

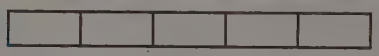
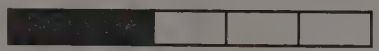


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▶ Build Fractions from Unit Fractions

Write the unit fractions for each whole. Next, shade the correct number of parts. Then show each shaded fraction as a sum of unit fractions.

9.  →  Shade 2 parts.

Divide the whole into 5 equal parts.

$\frac{1}{5}+\frac{1}{5}+\frac{1}{5}+\frac{1}{5}+\frac{1}{5}$ $\frac{1}{5}+\frac{1}{5}=\frac{2}{5}$

10.  →  Shade 2 parts.

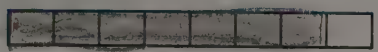
Divide the whole into 3 equal parts.

$\frac{1}{3}+\frac{1}{3}+\frac{1}{3}$ $\frac{1}{3}+\frac{1}{3}=\frac{2}{3}$

11.  →  Shade 5 parts.

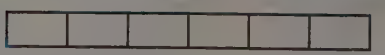
Divide the whole into 7 equal parts.

$\frac{1}{7}+\frac{1}{7}+\frac{1}{7}+\frac{1}{7}+\frac{1}{7}+\frac{1}{7}+\frac{1}{7}$ $\frac{1}{7}+\frac{1}{7}+\frac{1}{7}+\frac{1}{7}+\frac{1}{7}=\frac{5}{7}$

12.  →  Shade 7 parts.

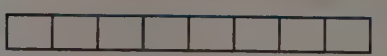
Divide the whole into 8 equal parts.

$\frac{1}{8}+\frac{1}{8}+\frac{1}{8}+\frac{1}{8}+\frac{1}{8}+\frac{1}{8}+\frac{1}{8}+\frac{1}{8}$ $\frac{1}{8}+\frac{1}{8}+\frac{1}{8}+\frac{1}{8}+\frac{1}{8}+\frac{1}{8}+\frac{1}{8}=\frac{7}{8}$

13.  →  Shade 3 parts.

Divide the whole into 6 equal parts.

$\frac{1}{6}+\frac{1}{6}+\frac{1}{6}+\frac{1}{6}+\frac{1}{6}+\frac{1}{6}$ $\frac{1}{6}+\frac{1}{6}+\frac{1}{6}=\frac{3}{6}$

14.  →  Shade 8 parts.

Divide the whole into 8 equal parts.

$\frac{1}{8}+\frac{1}{8}+\frac{1}{8}+\frac{1}{8}+\frac{1}{8}+\frac{1}{8}+\frac{1}{8}+\frac{1}{8}$ $\frac{1}{8}+\frac{1}{8}+\frac{1}{8}+\frac{1}{8}+\frac{1}{8}+\frac{1}{8}+\frac{1}{8}+\frac{1}{8}=\frac{8}{8}$

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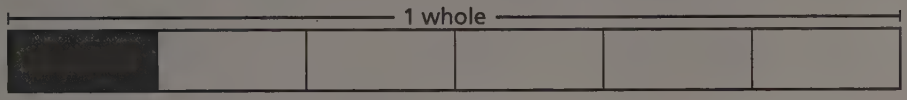
Name _____ Date _____

CA CC Content Standards 3.NF.1, 3.G.2
Mathematical Practices MP.2, MP.7

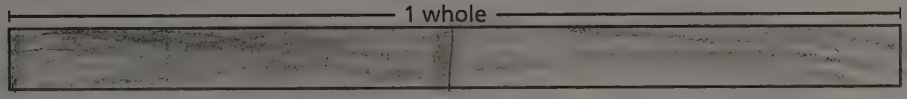
▶ Use Fraction Bars

Shade each fraction bar to show the fraction.
First, divide the fraction bar into the correct unit fractions.

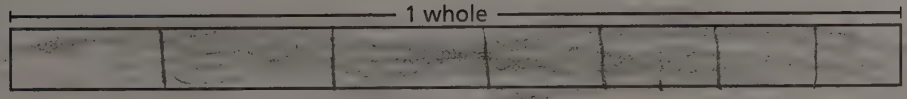
1. $\frac{1}{6}$



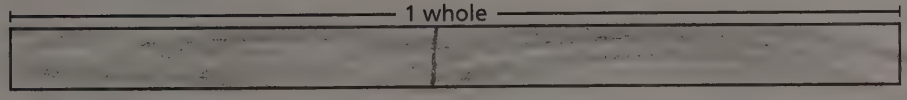
2. $\frac{2}{3}$



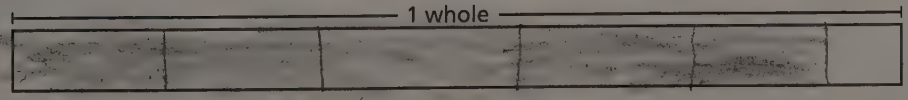
3. $\frac{7}{8}$



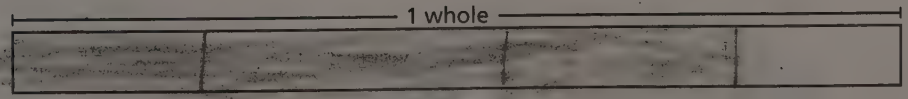
4. $\frac{2}{4}$



5. $\frac{5}{6}$



6. $\frac{3}{8}$



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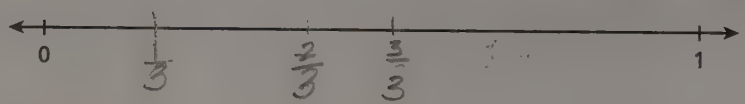
▶ Use Number Lines

Mark each number line to show the fraction.
First, divide the number line into the correct unit fractions.

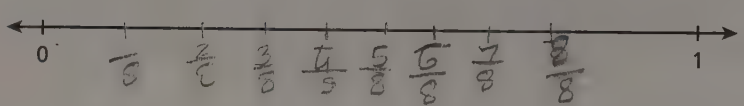
7. $\frac{1}{6}$



8. $\frac{2}{3}$



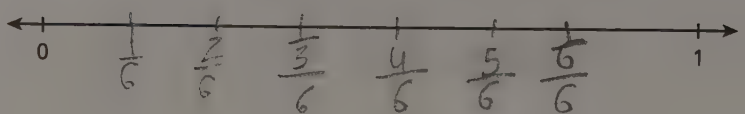
9. $\frac{7}{8}$



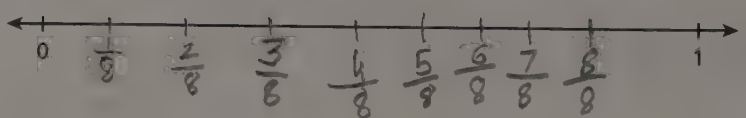
10. $\frac{2}{4}$



11. $\frac{5}{6}$



12. $\frac{3}{8}$



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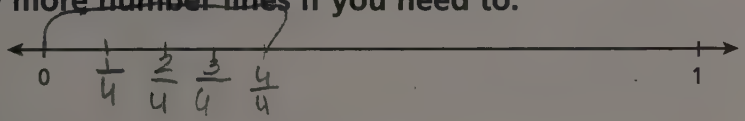
Name _____ Date _____

CA CC Content Standards 3.NF.2, 3.NF.2a, 3.NF.2b, 3.NF.3, 3.NF.3c
Mathematical Practices MP.2, MP.7

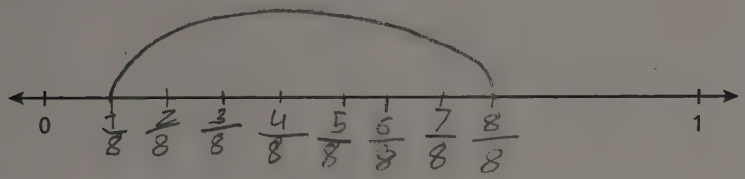
▶ Locate Fractions Less Than 1

Locate each fraction on the number line.
Draw more number lines if you need to.

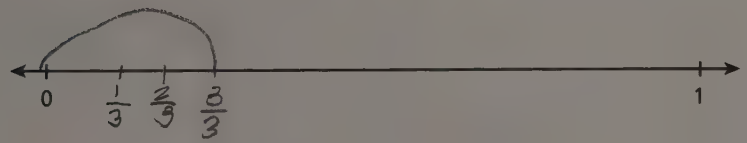
1. $\frac{1}{4}$



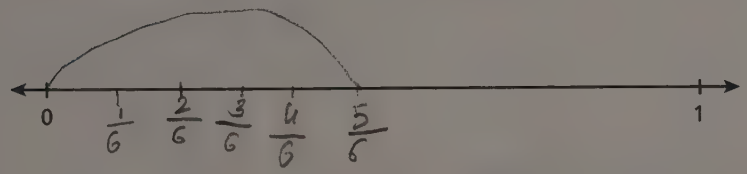
2. $\frac{1}{8}$



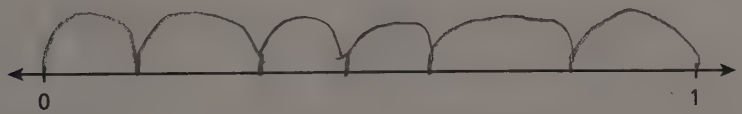
3. $\frac{2}{3}$



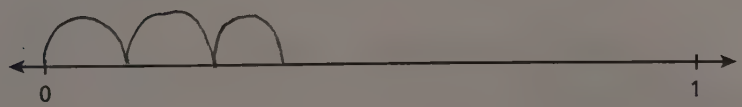
4. $\frac{5}{6}$



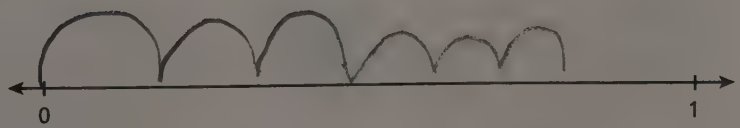
5. $\frac{1}{6}$ and $\frac{2}{3}$



6. $\frac{1}{3}$ and $\frac{5}{8}$



7. $\frac{1}{6}$ and $\frac{3}{4}$



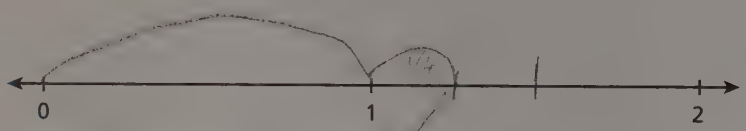
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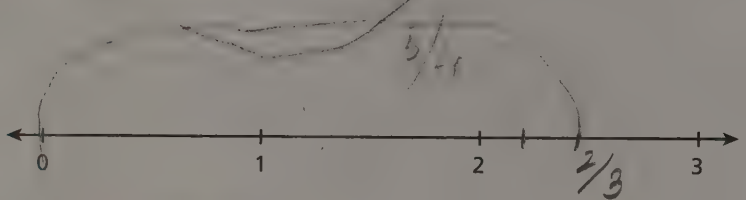
▶ Locate Fractions Greater Than 1

Locate each fraction on the number line.

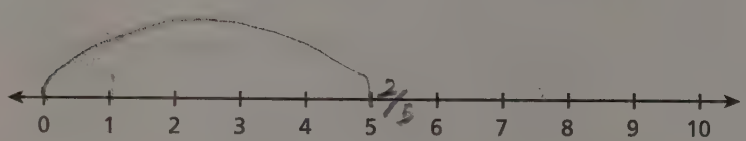
8. $\frac{5}{4}$



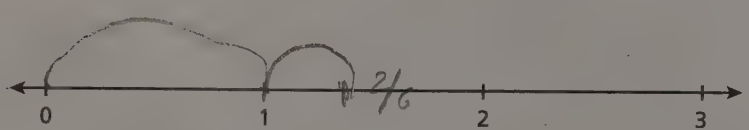
9. $\frac{8}{3}$



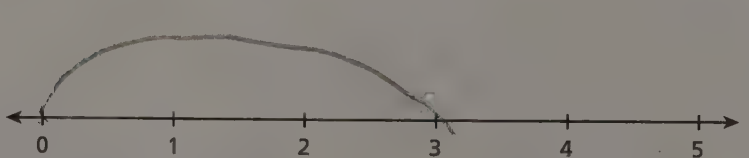
10. $\frac{5}{1}$



11. $\frac{8}{6}$



12. $\frac{6}{2}$



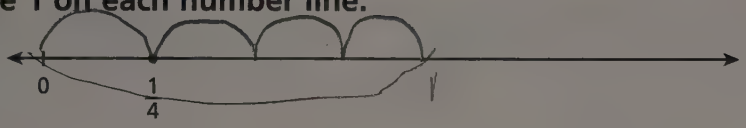
13. Explain how you located the fraction for one of the Exercises from 8–12.

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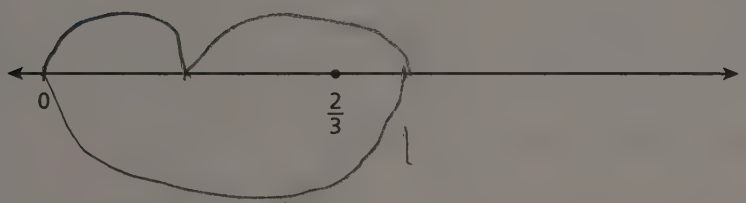
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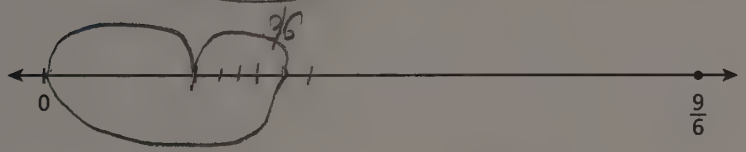
▶ Find 1

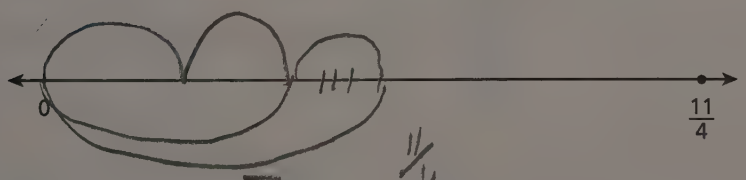
Locate 1 on each number line.

14. 

15. 

16. 

17. 

18. 

19. Explain how you ~~located~~ 1 for Exercise 17.

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Name _____ Date _____

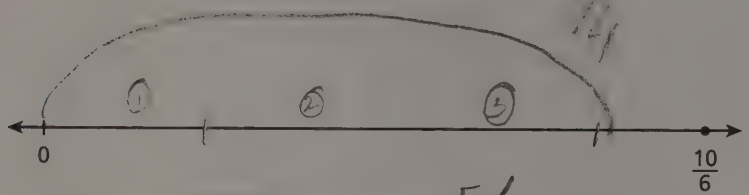
▶ Find Fractions

Locate each fraction on the number line.
Draw another number line if you need to.

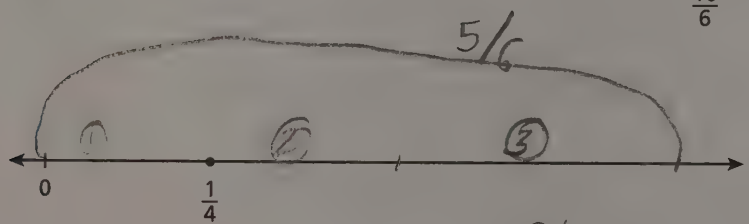
20. $\frac{3}{4}$



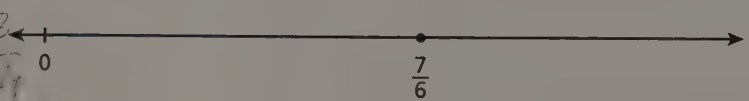
21. $\frac{5}{6}$



22. $\frac{2}{3}$



23. $\frac{7}{4}$



24. $\frac{7}{8}$



25. $\frac{10}{8}$



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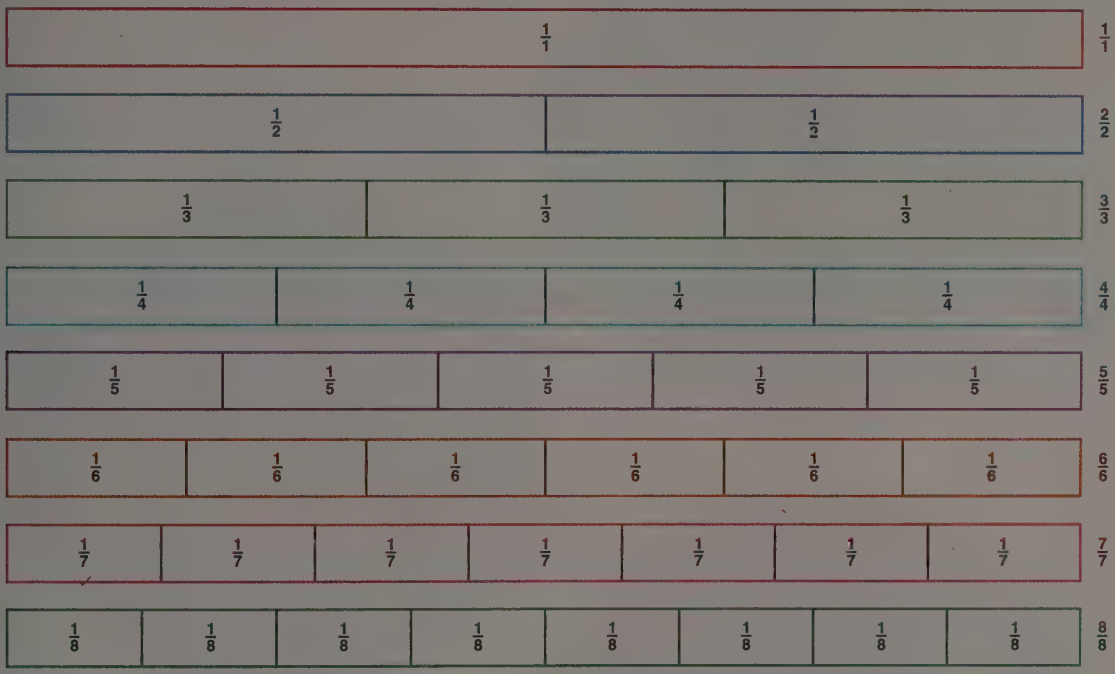
7-4 Class Activity

Name _____ Date _____

CA CC Content Standards 3.NF.3, 3.NF.3c, 3.NF.3d
Mathematical Practices MP.2

▶ Compare Unit Fractions with Fraction Bars

The fraction bars are made up of unit fractions. Look for patterns.



1. Describe two patterns that you see in the fraction bars.

Compare.

2. $\frac{1}{3}$ ○ $\frac{1}{7}$

3. $\frac{1}{3}$ ○ $\frac{1}{2}$

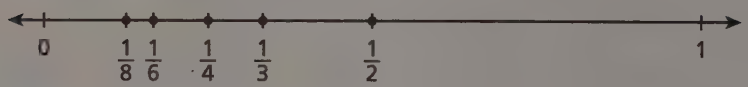
4. $\frac{1}{6}$ ○ $\frac{1}{7}$

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Name _____ Date _____

▶ Compare Unit Fractions with Number Lines

The number line shows unit fractions.
Look for patterns in the number line.



5. Describe a pattern that you see in the number line.

If the pattern

Compare. Use the fraction bars or the number line, if needed.

6. $\frac{1}{3} \bigcirc \frac{1}{8}$

7. $\frac{1}{4} \bigcirc \frac{1}{2}$

8. $\frac{1}{5} \bigcirc \frac{1}{8}$

9. $\frac{1}{2} \bigcirc \frac{1}{8}$

10. $\frac{1}{4} \bigcirc \frac{1}{7}$

11. $\frac{1}{6} \bigcirc \frac{1}{8}$

Solve. Use the fraction bars or the number line.

12. Between which two unit fractions would $\frac{1}{5}$ be on the number line?

$\frac{1}{4}$

13. Think about making a fraction bar for tenths.

a. How many unit fractions would be in the fraction bar?

10

b. How do you write the unit fraction?

$\frac{1}{10}$

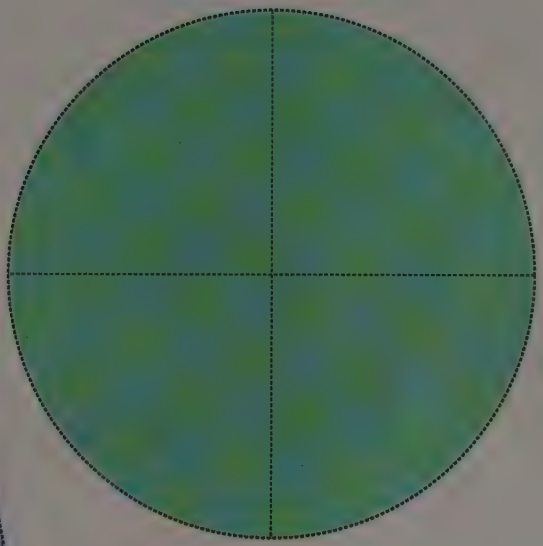
14. **Predict** Can the fraction bars for any unit fractions with even denominators always be split into two equal parts? Explain your thinking.

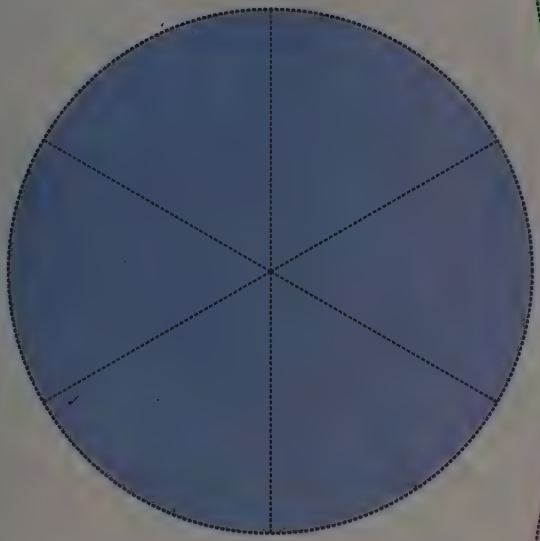
yes

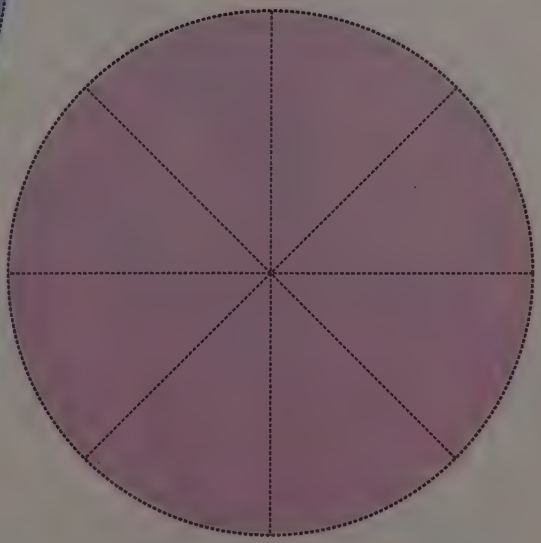
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▶ Fraction Circles

Label each unit fraction.
Then cut out the fraction circles on the dashed lines.







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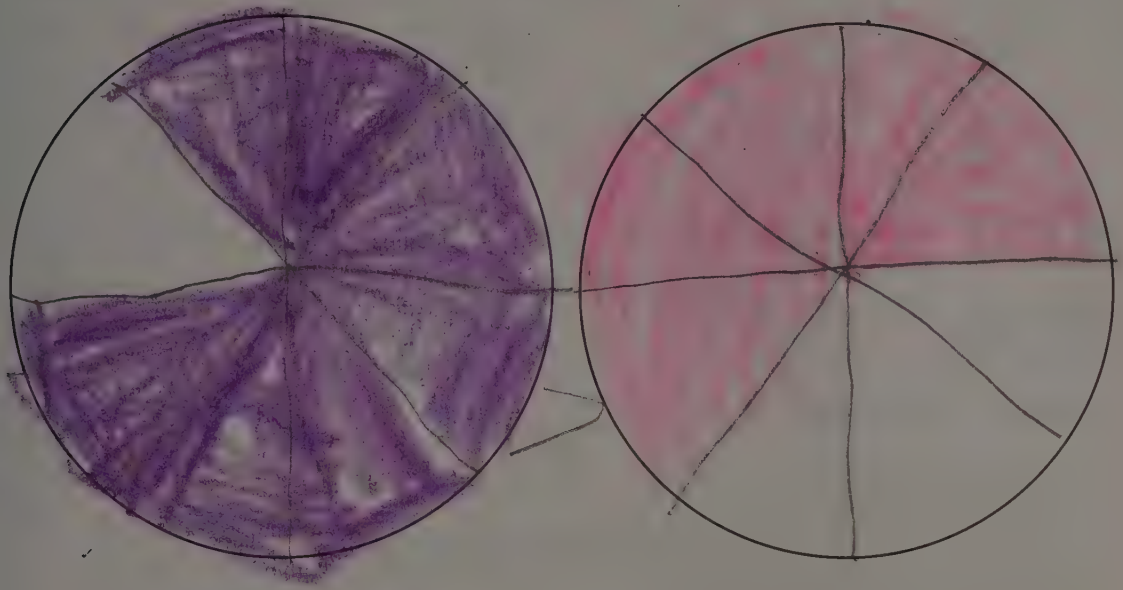
Name _____ Date _____

CA CC Content Standards 3.NF.1, 3.NF3d, 3.G.2
Mathematical Practices MP.2, MP.3, MP.6, MP.8

▶ Compare Fractions

Use these two circles as wholes.

Work with a partner. Use your fraction circles to compare fractions during the class activity.



Record your work during the class activity.

1. $\frac{7}{8}$ < $\frac{5}{8}$

2. $\frac{3}{6}$ < $\frac{5}{6}$

3. Explain how to compare two fractions that have the same denominator.

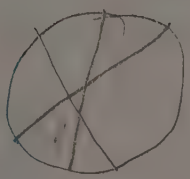
the fractions with the numerators

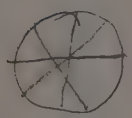
4. $\frac{3}{4}$ > $\frac{3}{8}$

5. $\frac{5}{8}$ < $\frac{5}{6}$

6. Explain how to compare two fractions that have the same numerator.

The fractions lesser denomination





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Name _____ Date _____

▶ Use Symbols to Compare Fractions

Compare. Use <, >, or =.

7. $\frac{2}{2} \bigcirc \frac{2}{3}$
8. $\frac{1}{3} \bigcirc \frac{5}{3}$
9. $\frac{3}{2} \bigcirc \frac{3}{6}$
10. $\frac{5}{6} \bigcirc \frac{4}{6}$
11. $\frac{4}{6} \bigcirc \frac{5}{6}$
12. $\frac{3}{4} \bigcirc \frac{3}{8}$
13. $\frac{6}{3} \bigcirc \frac{5}{3}$
14. $\frac{8}{4} \bigcirc \frac{8}{7}$
15. $\frac{5}{6} \bigcirc \frac{5}{3}$
16. $\frac{8}{5} \bigcirc \frac{12}{5}$
17. $\frac{6}{5} \bigcirc \frac{6}{4}$
18. $\frac{2}{2} \bigcirc \frac{4}{4}$
19. $\frac{5}{8} \bigcirc \frac{3}{8}$
20. $\frac{7}{3} \bigcirc \frac{7}{6}$
21. $\frac{7}{8} \bigcirc \frac{3}{8}$
22. $\frac{9}{4} \bigcirc \frac{9}{8}$
23. $\frac{4}{4} \bigcirc \frac{6}{6}$
24. $\frac{12}{7} \bigcirc \frac{11}{7}$
25. $\frac{8}{6} \bigcirc \frac{8}{2}$
26. $\frac{8}{1} \bigcirc \frac{12}{1}$

▶ What's the Error?

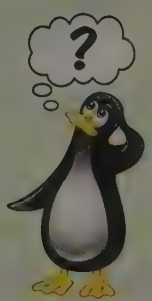
Dear Math Students,

Today my teacher asked me to compare $\frac{3}{7}$ and $\frac{3}{9}$ and to explain my thinking.

I wrote $\frac{3}{7} = \frac{3}{9}$. My thinking is that both fractions have 3 unit fractions so they must be equal.

Is my work correct? If not, please correct my work and tell me what I did wrong. How do you know my answer is wrong?

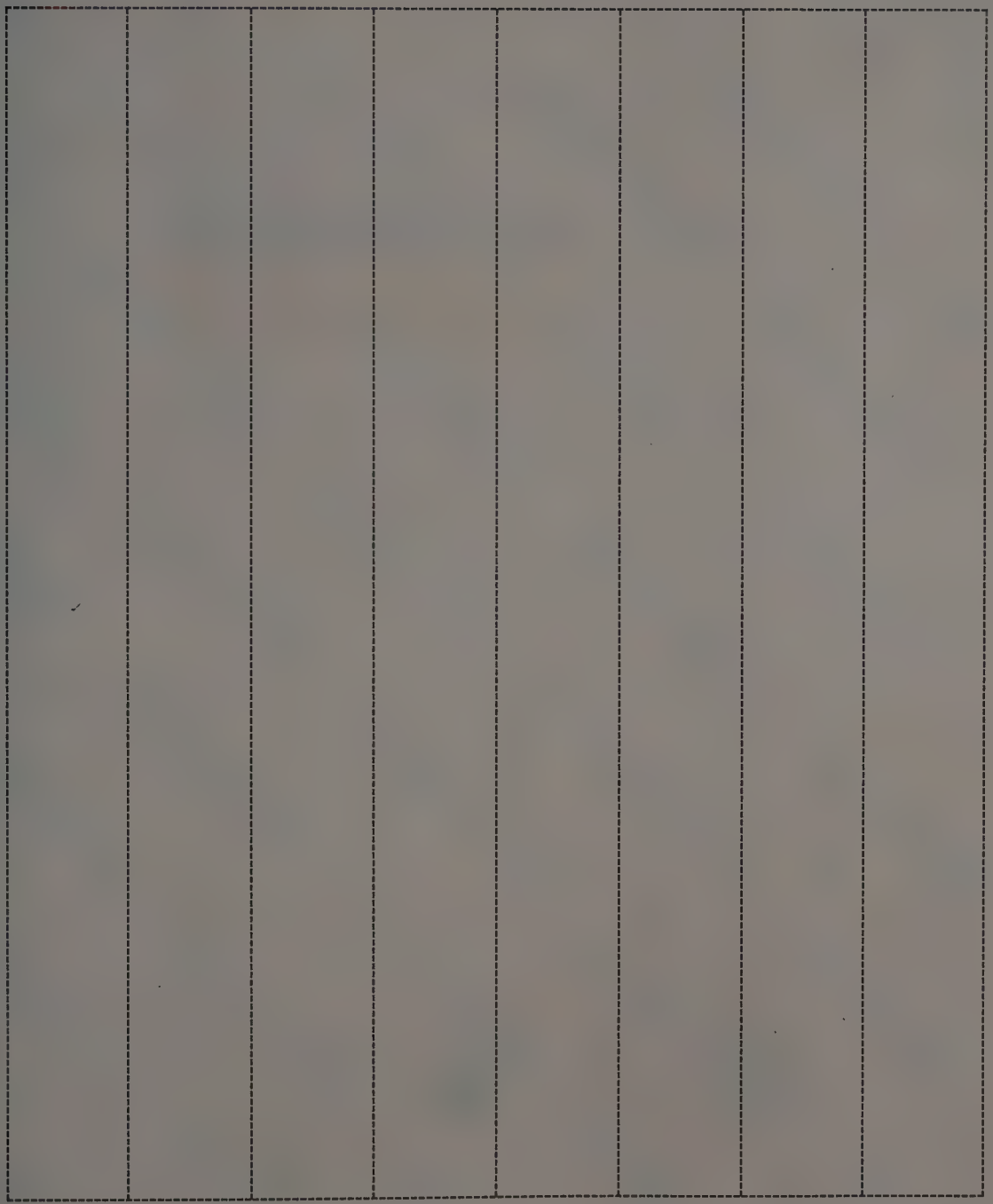
Your friend,
Puzzled Penguin



27. Write an answer to Puzzled Penguin.

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Make Fraction Strips



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CA CC Content Standards 3.NF.3, 3.NF.3a, 3.NF.3b
Mathematical Practices MP.2, MP.3, MP.6, MP.7

VOCABULARY
equivalent fractions

▶ Halves, Fourths, and Eighths

Two fractions are **equivalent fractions** if they name the same part of a whole.

Use your halves, fourths, and eighths strips to complete Exercises 1–4.

$\frac{1}{2}$				$\frac{1}{2}$			
$\frac{1}{4}$		$\frac{1}{4}$		$\frac{1}{4}$		$\frac{1}{4}$	
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$

1. If you compare your halves strip and your fourths strip, you can see that 2 fourths are the same as 1 half.

 Complete these two equations:

 2 fourths = 1 half

 $\frac{2}{4} = \frac{1}{2}$

2. How many eighths are in one half? 4

 Complete these two equations:

 4 eighths = 1 half

 $\frac{4}{8} = \frac{1}{2}$

3. What are two fractions that are equivalent to $\frac{1}{2}$?

 $\frac{2}{4}, \frac{4}{8}$

4. How many eighths are in one fourth? 2

 Complete these two equations:

 2 eighths = 1 fourth

 $\frac{2}{8} = \frac{1}{4}$

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▶ Thirds and Sixths

Use your thirds and sixths strips to answer Exercises 5–6.

5. How many sixths are in one third? 2

Complete these two equations:

$\frac{1}{3} \overset{\times 2}{=} \frac{2}{6}$ $\quad \times 2$

2 sixths = 1 third

$\frac{\square}{6} = \frac{1}{3}$

6. How many sixths are in two thirds? 4

Complete these two equations:

$\frac{2}{3} \overset{\times 2}{=} \frac{4}{6}$ $\quad \times 2$

4 sixths = 2 thirds

$\frac{4}{6} = \frac{2}{3}$

▶ What's the Error?

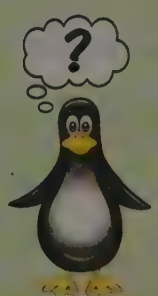
Dear Math Students,

Today my teacher asked me to name a fraction that is equivalent to $\frac{1}{2}$.

I wrote $\frac{2}{6} = \frac{1}{2}$

Is my answer correct? If not, please correct my work and tell me what I did wrong.

Your Friend,
Puzzled Penguin



7. Write an answer to Puzzled Penguin.

No, it should be $\frac{3}{6} = \frac{1}{2}$
because 3 is half of 6.

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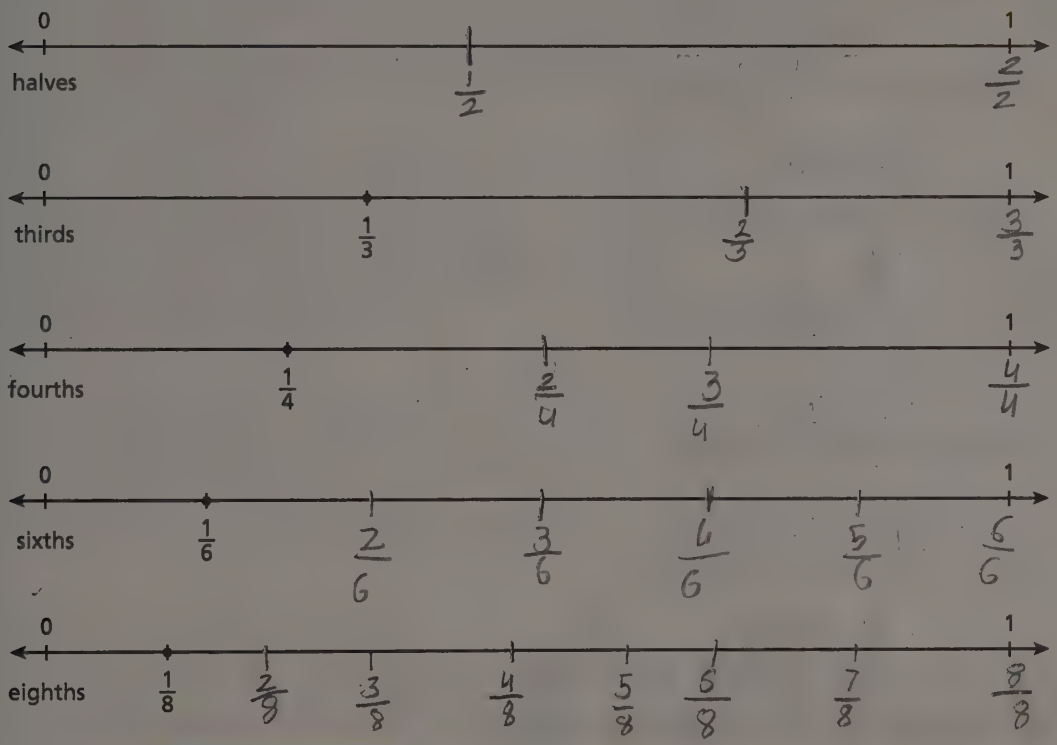
Name _____ Date _____

CA CC Content Standards 3.NF.2a, 3.NF.2b, 3.NF.3, 3.NF.3a, 3.NF.3b, 3.NF.3c Mathematical Practices MP.1, MP.2

VOCABULARY
equivalence chain

▶ Equivalent Fractions on Number Lines

1. Complete each number line. Show all fractions including each fraction for 1.



2. Write an **equivalence chain** with fractions that equal $\frac{2}{2}$.

$\frac{2}{2} = \frac{3}{3} = \frac{4}{4} = \frac{6}{6} = \frac{8}{8}$

3. Why are the fractions in the equivalence chain for $\frac{2}{2}$ equal?

they eqvcal 1

4. Why does the length of unit fractions grow smaller as their denominators get larger?

The mare you divde it the smaller the lenth.

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Name _____ Date _____

► Equivalence Chains

Use your number lines from page 385 to write an equivalence chain.

5. With fractions that equal $\frac{1}{2}$

$\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{4}{8}$

6. With fractions that equal $\frac{1}{3}$

$\frac{1}{3} = \frac{2}{6}$

7. With fractions that equal $\frac{2}{3}$

$\frac{2}{3} = \frac{4}{6}$

8. With fractions that equal $\frac{1}{4}$

$\frac{1}{4} = \frac{2}{8}$

9. With fractions that equal $\frac{3}{4}$

$\frac{3}{4} = \frac{6}{8}$

10. With fractions that equal $\frac{8}{8}$

$\frac{2}{2}, \frac{3}{3}, \frac{4}{4}, \frac{8}{8}$

Solve. Use what you have learned about equivalent fractions and about comparing fractions. Show your work.

11. Jaime has $\frac{1}{2}$ dozen red marbles and $\frac{4}{8}$ dozen green marbles. Does he have more red or green marbles?

They are equal

12. Nancy buys $\frac{3}{6}$ pound of walnuts. Sandra buys $\frac{3}{4}$ pound of almonds. Who buys more nuts?

sandra $\frac{3}{4} > \frac{3}{6}$

13. Chin and Maya collected shells at the beach. They both used the same kind of basket. Chin collected $\frac{3}{4}$ basket and Maya collected $\frac{3}{3}$ basket. Who collected more shells?

maya $\frac{3}{3} > \frac{3}{4}$

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7-8 Class Activity

Name _____ Date _____

CA CC Content Standards 3.NF.3, 3.NF.3a, 3.NF.3b, 3.NF.3c, 3.NF.3d
Mathematical Practices MP.1, MP.2, MP.4

▶ Solve Fraction Problems

Solve. Draw diagrams or number lines if you need to. Show your work.

1. The shelves in Roger's bookcase are $\frac{7}{8}$ yard long. Latanya's bookcase has shelves that are $\frac{5}{8}$ yard long. Whose bookcase has longer shelves? How do you know?

2. Rosa buys $\frac{3}{4}$ pound of cheddar cheese. Lucy buys $\frac{3}{8}$ pound of goat cheese. Who buys more cheese? Explain your answer.

3. Martha baked $\frac{8}{4}$ dozen cranberry muffins. Vera baked $\frac{8}{6}$ dozen banana muffins. Who baked fewer muffins? How do you know?

4. Lester walks $\frac{3}{4}$ mile to school. Bert said that he walks farther because he walks $\frac{6}{8}$ mile to school. Is his statement correct? Explain your answer.

5. Jack's family has a pickup truck that weighs $\frac{9}{4}$ ton. Ruth's family has a car that weighs $\frac{9}{8}$ ton. Is the pickup truck or the car heavier? How do you know?

6. Rusty painted $\frac{5}{6}$ of a mural for the school hallway. Has he painted more than half of the mural? Explain your answer.
Hint: Find an equivalent fraction in sixths for $\frac{1}{2}$.

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Name _____ Date _____

► Solve Fraction Problems (continued)

Solve. Draw diagrams or number lines if it helps. Show your work.

7. Pearl used $\frac{3}{3}$ yard of fabric to make a pillow. Julia made her pillow from $\frac{4}{4}$ yard of fabric. They both paid $5 a yard for their fabric. Who paid more for fabric? How do you know?

8. At Binata's Bakery, two different recipes are used for wheat bread. For a round loaf, $\frac{5}{2}$ cups of wheat flour is used. For a long loaf, $\frac{7}{2}$ cups of wheat flour is used. For which kind of bread is more wheat flour used? Explain your answer.

9. Deena's water bottle can hold a total of $\frac{2}{5}$ liter of water. John's water bottle can hold a total of $\frac{5}{2}$ liter of water. Whose water bottle holds more water? How do you know?

10. Andy, Lu, and Carlos have $\frac{3}{3}$, $\frac{3}{4}$, and $\frac{3}{6}$ dozen pencils, but not in that order. Andy has the fewest pencils and Lu has the most. How many pencils does each boy have? Explain.

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CA CC Content Standards 3.NF.1, 3.NF.3, 3.NF.3a, 3.NF.3b, 3.G.2
Mathematical Practices MP.2, MP.7

▶ Math and Paper Folding



The art of paper folding began in China. Later, Japan's version of paper folding, called origami, became very popular. Origami sculptures are made from a flat sheet of square paper through folding and sculpting techniques without cuts or glue.

Complete.



1. Fold a square sheet of paper in half diagonally. What part of the square is each triangle?



2. Fold the paper in half again. What part of the square is each triangle?



3. Fold the paper in half again. Open the paper. What part of the square is each triangle?

4. Explain how you know the eight parts have the same area.



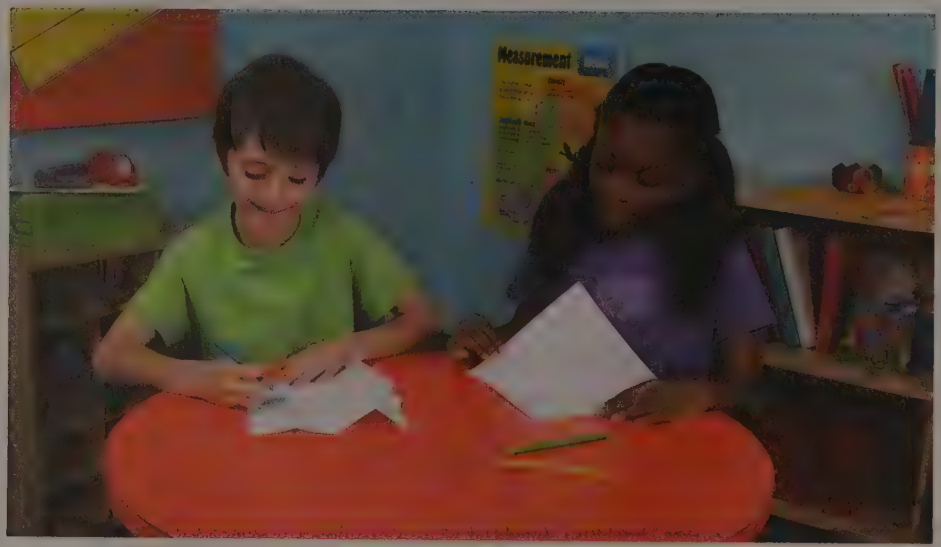
5. Fold four triangles to the center as shown on the right. What part of the square is each triangle? Explain how you know.

This basic origami fold is used for making many objects.

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Name _____ Date _____

▶ Math and Design



Complete.

6. Fold a square sheet of paper in half three times.
 Open the paper. Choose two different colors.
 Color every other rectangle or triangle one color.
 Color the other rectangles or triangles the second color.

7. Write 3 equivalent fractions for the part of the square that is colored the same color.

8. Predict the number of shapes you would make if you folded the square 4 times. Explain.

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Reference Tables

Table of Measures

Metric	Customary
Length/Area	
1 meter (m) = 10 decimeters (dm)	1 foot (ft) = 12 inches (in.)
1 meter (m) = 100 centimeters (cm)	1 yard = 3 feet (ft)
1 decimeter (dm) = 10 centimeters (cm)	1 mile (mi) = 5,280 feet (ft)
1 square centimeter = 1 cm^2 A metric unit for measuring area. It is the area of a square that is one centimeter on each side.	1 square inch = 1 in^2 A customary unit for measuring area. It is the area of a square that is one inch on each side.
Liquid Volume	
1 liter (L) = 1,000 milliliters (mL)	1 tablespoon (tbsp) = $\frac{1}{2}$ fluid ounce (fl oz) 1 cup (c) = 8 fluid ounces (fl oz) 1 pint (pt) = 2 cups (c) 1 quart (qt) = 2 pints (pt) 1 gallon (gal) = 4 quarts (qt)

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Table of Units of Time

Time

1 minute (min) = 60 seconds (sec)
1 hour (hr) = 60 minutes
1 day = 24 hours
1 week (wk) = 7 days
1 month, about 30 days
1 year (yr) = 12 months (mo)
or about 52 weeks

1 year = 365 days
1 leap year = 366 days

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Properties of Operations

Associative Property of Addition

$(a + b) + c = a + (b + c)$ $\quad (2 + 5) + 3 = 2 + (5 + 3)$

Commutative Property of Addition

$a + b = b + a$ $\quad 4 + 6 = 6 + 4$

Identity Property of Addition

$a + 0 = 0 + a = a$ $\quad 3 + 0 = 0 + 3 = 3$

Associative Property of Multiplication

$(a \cdot b) \cdot c = a \cdot (b \cdot c)$ $\quad (3 \cdot 5) \cdot 7 = 3 \cdot (5 \cdot 7)$

Commutative Property of Multiplication

$a \cdot b = b \cdot a$ $\quad 6 \cdot 3 = 3 \cdot 6$

Identity Property of Multiplication

$a \cdot 1 = 1 \cdot a = a$ $\quad 8 \cdot 1 = 1 \cdot 8 = 8$

Zero Property of Multiplication

$a \cdot 0 = 0 \cdot a = 0$ $\quad 5 \cdot 0 = 0 \cdot 5 = 0$

Distributive Property of Multiplication over Addition

$a \cdot (b + c) = (a \cdot b) + (a \cdot c)$ $\quad 2 \cdot (4 + 3) = (2 \cdot 4) + (2 \cdot 3)$

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Problem Types

Addition and Subtraction Problem Types

	Result Unknown	Change Unknown	Start Unknown
Add to	Aisha had 274 stamps in her collection. Then her grandfather gave her 65 stamps. How many stamps does she have now? *Situation and solution equation:*[1] $274 + 65 = s$	Aisha had 274 stamps in her collection. Then her grandfather gave her some stamps. Now she has 339 stamps. How many stamps did her grandfather give her? *Situation equation:* $274 + s = 339$ *Solution equation:* $s = 339 - 274$	Aisha had some stamps in her collection. Then her grandfather gave her 65 stamps. Now she has 339 stamps. How many stamps did she have to start? *Situation equation* $s + 65 = 339$ *Solution equation:* $s = 339 - 65$
Take from	A store had 750 bottles of water at the start of the day. During the day, the store sold 490 bottles. How many bottles did they have at the end of the day? *Situation and solution equation:* $750 - 490 = b$	A store had 750 bottles of water at the start of the day. The store had 260 bottles left at the end of the day. How many bottles did the store sell? *Situation equation:* $750 - b = 260$ *Solution equation:* $b = 750 - 260$	A store had a number of bottles of water at the start of the day. The store sold 490 bottles of water. At the end of the day 260 bottles were left. How many bottles did the store have to start with? *Situation equation:* $b - 490 = 260$ *Solution equation:* $b = 260 + 490$

[1]A situation equation represents the structure (action) in the problem situation. A solution equation shows the operation used to find the answer.

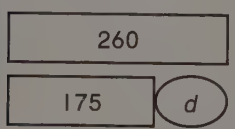
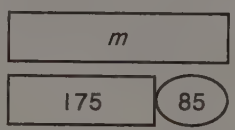
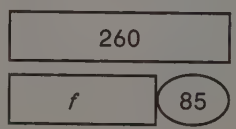
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	Total Unknown	Addend Unknown	Both Addends Unknown
Put Together/ Take Apart	A clothing store has 375 shirts with short sleeves and 148 shirts with long sleeves. How many shirts does the store have in all? *Math drawing:*  *Situation and solution equation:* $375 + 148 = s$	Of the 523 shirts in a clothing store, 375 have short sleeves. The rest have long sleeves. How many shirts have long sleeves? *Math drawing:*  *Situation equation:* $523 = 375 + l$ *Solution equation:* $l = 523 - 375$	A clothing store has 523 shirts. Some have short sleeves and some have long sleeves. How many of the shirts have short sleeves and how many have long sleeves? *Math drawing:*  *Situation equation* $523 = s + l$

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Problem Types continued

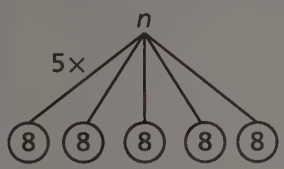
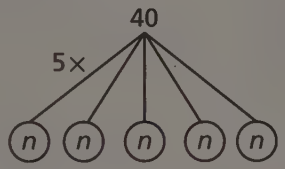
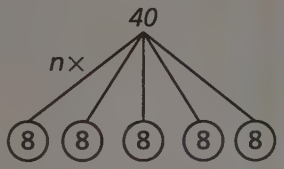
Addition and Subtraction Problem Types (continued)

	Difference Unknown	Greater Unknown	Smaller Unknown
Compare	At a zoo, the female black bear weighs 175 pounds. The male black bear weighs 260 pounds. How much more does the male black bear weigh than the female black bear? At a zoo, the female black bear weighs 175 pounds. The male black bear weighs 260 pounds. How much less does the female black bear weigh than the male black bear? *Math drawing:*  *Situation equation:* $175 + d = 260$ or $d = 260 - 175$ *Solution equation:* $d = 260 - 175$	**Leading Language** At a zoo, the female black bear weighs 175 pounds. The male black bear weighs 85 pounds more than the female black bear. How much does the male black bear weigh? **Misleading Language** At a zoo, the female black bear weighs 175 pounds. The female black bear weighs 85 pounds less than the male black bear. How much does the male black bear weigh? *Math drawing:*  *Situation and solution equation:* $175 + 85 = m$	**Leading Language** At a zoo, the male black bear weighs 260 pounds. The female black bear weighs 85 pounds less than the male black bear. How much does the female black bear weigh? **Misleading Language** At a zoo, the male black bear weighs 260 pounds. The male black bear weighs 85 pounds more than the female black bear. How much does the female black bear weigh? *Math drawing:*  *Situation equation* $f + 85 = 260$ or $f = 260 - 85$ *Solution equation:* $f = 260 - 85$

A comparison sentence can always be said in two ways. One way uses *more*, and the other uses *fewer* or *less*. Misleading language suggests the wrong operation. For example, it says *the female black bear weighs 85 pounds less than the male*, but you have to add 85 pounds to the female's weight to get the male's weight.

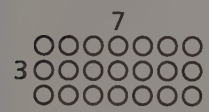
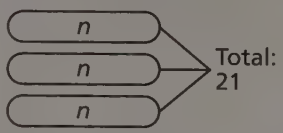
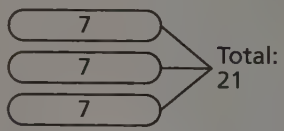
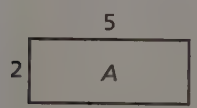
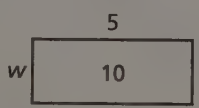
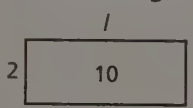
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Multiplication and Division Problem Types

	Unknown Product	Group Size Unknown	Number of Groups Unknown
Equal Groups	A teacher bought 5 boxes of markers. There are 8 markers in each box. How many markers did the teacher buy? *Math drawing:*  *Situation and solution equation:* $n = 5 \cdot 8$	A teacher bought 5 boxes of markers. She bought 40 markers in all. How many markers are in each box? *Math drawing:*  *Situation equation:* $5 \cdot n = 40$ *Solution equation:* $n = 40 \div 5$	A teacher bought boxes of 8 markers. She bought 40 markers in all. How many boxes of markers did she buy? *Math drawing:*  *Situation equation* $n \cdot 8 = 40$ *Solution equation:* $n = 40 \div 8$

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Problem Types (continued)

	Unknown Product	Unknown Factor	Unknown Factor
Arrays	For the yearbook photo, the drama club stood in 3 rows of 7 students. How many students were in the photo in all? *Math drawing:*  *Situation and solution equation:* $n = 3 \cdot 7$	For the yearbook photo, the 21 students in drama club, stood in 3 equal rows. How many students were in each row? *Math drawing:*  *Situation equation:* $3 \cdot n = 21$ *Solution equation:* $n = 21 \div 3$	For the yearbook photo, the 21 students in drama club, stood in rows of 7 students. How many rows were there? *Math drawing:*  *Situation equation* $n \cdot 7 = 21$ *Solution equation:* $n = 21 \div 7$
Area	The floor of the kitchen is 2 meters by 5 meters. What is the area of the floor? *Math drawing:*  *Situation and solution equation:* $A = 5 \cdot 2$	The floor of the kitchen is 5 meters long. The area of the floor is 10 square meters. What is the width of the floor? *Math drawing:*  *Situation equation:* $5 \cdot w = 10$ *Solution equation:* $w = 10 \div 5$	The floor of the kitchen is 2 meters wide. The area of the floor is 10 square meters. What is the length of the floor? *Math drawing:*  *Situation equation* $l \cdot 2 = 10$ *Solution equation:* $l = 10 \div 2$

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Vocabulary Activities

MathWord Power

▸ Word Review PAIRS

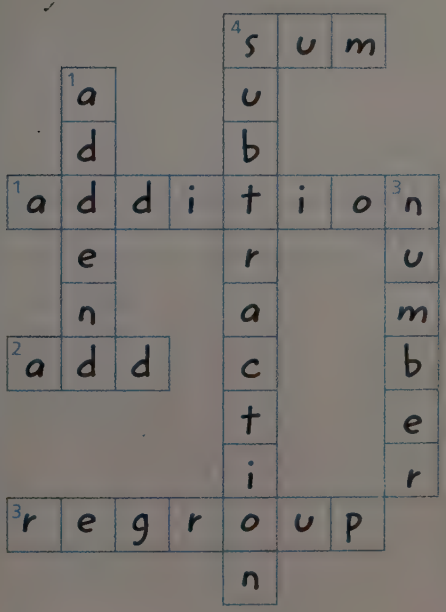
Work with a partner. Choose a word from a current unit or a review word from a previous unit. Use the word to complete one of the activities listed on the right. Then ask your partner if they have any edits to your work or questions about what you described. Repeat, having your partner choose a word.

Activities

- Give the meaning in words or gestures.
- Use the word in the sentence.
- Give another word that is related to the word in some way and explain the relationship.

▸ Crossword Puzzle PAIRS OR INDIVIDUALS

Create a crossword puzzle similar to the example below. Use vocabulary words from the unit. You can add other related words, too. Challenge your partner to solve the puzzle.



Across

1. _____ and subtraction are inverse operations.
2. To put amounts together
3. When you trade 10 ones for 1 ten, you _____.
4. The answer to an addition problem

Down

1. In 24 + 65 = 89, 24 is an _____.
3. A combination of the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9.
4. The operation that you can use to find out how much more one number is than another.

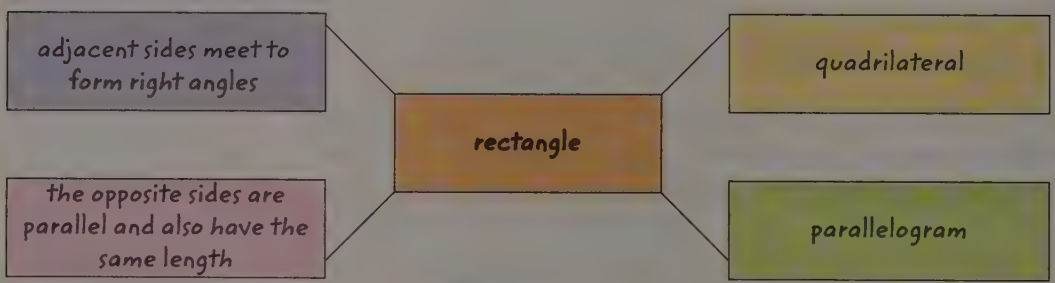
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▶ Word Wall PAIRS OR SMALL GROUPS

With your teacher's permission, start a word wall in your classroom. As you work through each lesson, put the math vocabulary words on index cards and place them on the word wall. You can work with a partner or a small group choosing a word and giving the definition.

▶ Word Web INDIVIDUALS

Make a word web for a word or words you do not understand in a unit. Fill in the web with words or phrases that are related to the vocabulary word.



▶ Alphabet Challenge PAIRS OR INDIVIDUALS

Take an alphabet challenge. Choose 3 letters from the alphabet. Think of three vocabulary words for each letter. Then write the definition or draw an example for each word.

A	D	L
addition array area	data denominator divide	liter line segment line plot

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► Concentration PAIRS

Write the vocabulary words and related words from a unit on index cards. Write the definitions on a different set of index cards. Mix up both sets of cards. Then place the cards facedown on a table in an array, for example, 3 by 3 or 3 by 4. Take turns turning over two cards. If one card is a word and one card is a definition that matches the word, take the pair. Continue until each word has been matched with its definition.

area		
		the number of square units in a region

► Math Journal INDIVIDUALS

As you learn new words, write them in your Math Journal. Write the definition of the word and include a sketch or an example. As you learn new information about the word, add notes to your definition.

polygon: a closed plane figure with sides made of straight line segments.



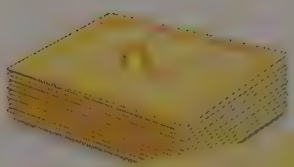
In concave polygons, there exists a line segment with endpoints inside the polygon and a point on the line segment that is outside the polygon.

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▶ What's the Word? PAIRS

Work together to make a poster or bulletin board display of the words in a unit. Write definitions on a set of index cards. Mix up the cards. Work with a partner, choosing a definition from the index cards. Have your partner point to the word on the poster and name the matching math vocabulary word. Switch roles and try the activity again.

fraction	fourths
unit fraction	eighths
denominator	halves
numerator	sixths
equivalent	
equivalent fractions	
equivalence chain	
thirds	



the bottom number in a fraction that shows the total number of equal parts in the whole

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Glossary

A

addend One of two or more numbers to be added together to find a sum.

Example: $8 + 4 = 12$

addend addend sum

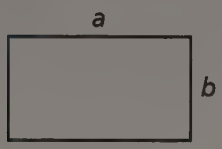
addition A mathematical operation that combines two or more numbers.

Example: $23 + 52 = 75$

addend addend sum

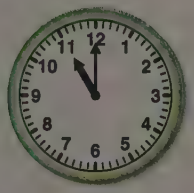
adjacent (sides) Two sides of a figure that meet at a point.

Example: Sides *a* and *b* are adjacent.



A.M. The time period between midnight and noon.

analog clock A clock with a face and hands.



angle A figure formed by two rays or two line segments that meet at an endpoint.

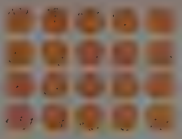


area The total number of square units that cover a figure.



Example: The area of the rectangle is 6 square units.

array An arrangement of objects, pictures, or numbers in columns and rows.



Associative Property of Addition (Grouping Property of Addition)

The property which states that changing the way in which addends are grouped does not change the sum.

Example: $(2 + 3) + 1 = 2 + (3 + 1)$

$5 + 1 = 2 + 4$

$6 = 6$

Associative Property of Multiplication (Grouping Property of Multiplication)

The property which states that changing the way in which factors are grouped does not change the product.

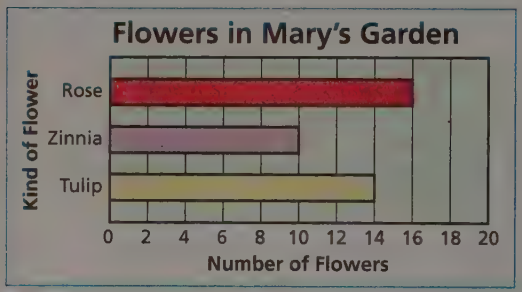
Example: $(2 \times 3) \times 4 = 2 \times (3 \times 4)$

$6 \times 4 = 2 \times 12$

$24 = 24$

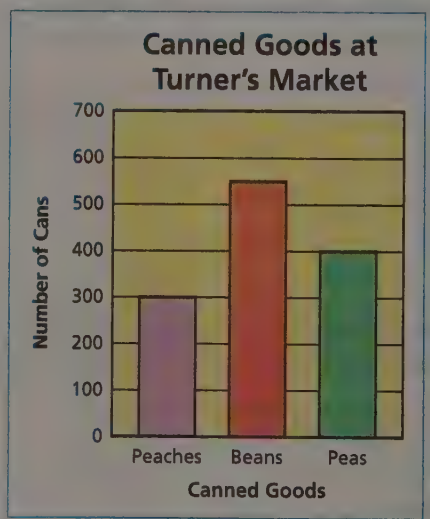
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axis (plural: **axes**) A reference line for a graph. A graph has 2 axes; one is horizontal and the other is vertical.



B

bar graph A graph that uses bars to show data. The bars may be horizontal, as in the graph above, or vertical, as in the graph below.



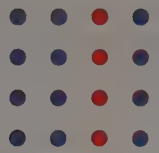
C

capacity The amount a container can hold.

centimeter (cm) A metric unit used to measure length.

100 centimeters = 1 meter

column A part of a table or array that contains items arranged vertically.



Commutative Property of Addition (Order Property of Addition) The property which states that changing the order of addends does not change the sum.

Example: $3 + 7 = 7 + 3$

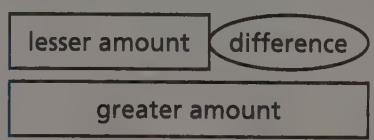
$10 = 10$

Commutative Property of Multiplication (Order Property of Multiplication) The property which states that changing the order of factors does not change the product.

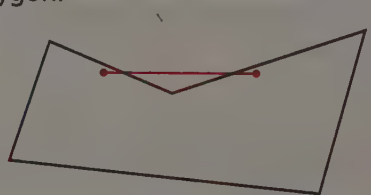
Example: $5 \times 4 = 4 \times 5$

$20 = 20$

comparison bars Bars that represent the greater amount, lesser amount, and difference in a comparison problem.

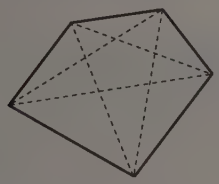


concave A polygon for which you can connect two points inside the polygon with a segment that passes outside the polygon.



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convex A polygon is convex if all of its diagonals are inside it.



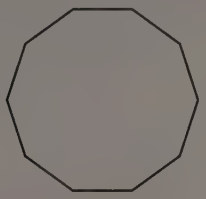
cup (c) A customary unit of measure used to measure capacity.

1 cup = 8 fluid ounces
2 cups = 1 pint
4 cups = 1 quart
16 cups = 1 gallon

D

data Pieces of information.

decagon A polygon with 10 sides.



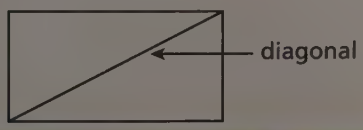
decimeter (dm) A metric unit used to measure length

1 decimeter = 10 centimeters

denominator The bottom number in a fraction that shows the total number of equal parts in the whole.

Example: $\frac{1}{3}$ ← denominator

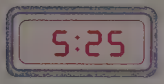
diagonal A line segment that connects two corners of a figure and is not a side of the figure.



difference The result of subtraction or of comparing.

digit Any of the symbols 0, 1, 2, 3, 4, 5, 6, 7, 8, 9.

digital clock A clock that displays the hour and minutes with numbers.



Distributive property You can multiply a sum by a number, or multiply each addend by the number and add the products; the result is the same.

Example:

$3 \times (2 + 4) = (3 \times 2) + (3 \times 4)$
$3 \times 6 = 6 + 12$
$18 = 18$

dividend The number that is divided in division.

Examples:

$12 \div 3 = 4$ (dividend)

$3\overline{)12}$ (dividend)

division The mathematical operation that separates an amount into smaller equal groups to find the number of groups or the number in each group.

Example: $12 \div 3 = 4$ is a division number sentence.

divisor The number that you divide by in division.

Example: $12 \div 3 = 4$ (divisor)

$3\overline{)12}$ (divisor)

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E

elapsed time The time that passes between the beginning and the end of an activity.

endpoint The point at either end of a line segment or the beginning point of a ray.



equation A mathematical sentence with an equals sign.

Examples: $11 + 22 = 33$
$75 - 25 = 50$

equivalent Equal, or naming the same amount.

equivalent fractions Fractions that name the same amount.

Example: $\frac{1}{2}$ and $\frac{2}{4}$

equivalent fractions

estimate About how many or about how much.

even number A whole number that is a multiple of 2. The ones digit in an even number is 0, 2, 4, 6, or 8.

expanded form A number written to show the value of each of its digits.

Examples:
$347 = 300 + 40 + 7$
$347 = 3$ hundreds $+ 4$ tens $+ 7$ ones

expression A combination of numbers, variables, and/or operation signs. An expression does not have an equals sign.

Examples: $4 + 7$ $a - 3$

F

factors Numbers that are multiplied to give a product.

Example: $4 \times 5 = 20$

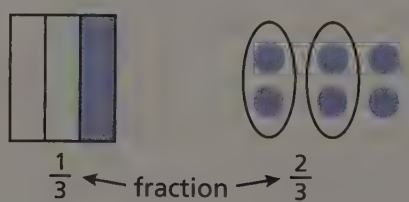
factor factor product

fluid ounce (fl oz) A unit of liquid volume in the customary system that equals $\frac{1}{8}$ cup or 2 tablespoons.

foot (ft) A customary unit used to measure length.

1 foot = 12 inches

fraction A number that names part of a whole or part of a set.



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frequency table A table that shows how many times each event, item, or category occurs.

Frequency Table	
Age	Tally
7	1
8	3
9	5
10	4
11	2

function table A table of ordered pairs that shows a function.

For every input number, there is only one possible output number.

Rule: add 2	
Input	Output
1	3
2	4
3	5
4	6

G

gallon (gal) A customary unit used to measure capacity.

1 gallon = 4 quarts = 8 pints = 16 cups

gram (g) A metric unit of mass. One paper clip has a mass of about 1 gram.

1,000 grams = 1 kilogram

greater than (>) A symbol used to compare two numbers.

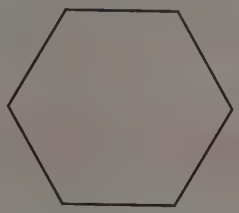
Example: $6 > 5$
6 *is greater than* 5.

group To combine numbers to form new tens, hundreds, thousands, and so on.

H

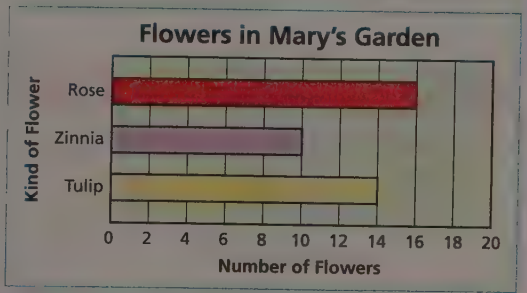
height A vertical distance, or how tall something is.

hexagon A polygon with six sides.



horizontal Extending in two directions, left and right.

horizontal bar graph A bar graph with horizontal bars.



I

Identity Property of Addition If 0 is added to a number, the sum equals that number.

Example: $3 + 0 = 3$

Identity Property of Multiplication The product of 1 and any number equals that number.

Example: $10 \times 1 = 10$

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improper fraction A fraction in which the numerator is equal to or is greater than the denominator. Improper fractions are equal to or greater than 1. $\frac{5}{5}$ and $\frac{8}{3}$ are improper fractions.

inch (in.) A customary unit used to measure length.

12 inches = 1 foot

K

key A part of a map, graph, or chart that explains what symbols mean.

kilogram (kg) A metric unit of mass.

1 kilogram = 1,000 grams

kilometer (km) A metric unit of length.

1 kilometer = 1,000 meters

L

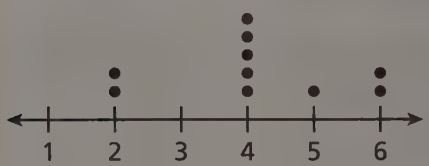
less than (<) A symbol used to compare numbers.

Example: $5 < 6$
5 *is less than* 6.

line A straight path that goes on forever in opposite directions.



line plot A diagram that shows frequency of data on a number line. Also called a *dot plot*.



line segment A part of a line. A line segment has two endpoints.



liquid volume A measure of how much a container can hold. Also called *capacity*.

liter (L) A metric unit used to measure capacity.

1 liter = 1,000 milliliters

M

mass The amount of matter in an object.

mental math A way to solve problems without using pencil and paper or a calculator.

meter (m) A metric unit used to measure length.

1 meter = 100 centimeters

method A procedure, or way, of doing something.

mile (mi) A customary unit of length.

1 mile = 5,280 feet

milliliter (mL) A metric unit used to measure capacity.

1,000 milliliters = 1 liter

mixed number A whole number and a fraction.

$1\frac{3}{4}$ is a mixed number.

multiple A number that is the product of the given number and any whole number.

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multiplication A mathematical operation that combines equal groups.

Example: $4 \times 3 = 12$

factor factor product

$3 + 3 + 3 + 3 = 12$

4 times

N

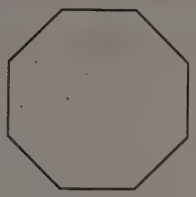
number line A line on which numbers are assigned to lengths.

numerator The top number in a fraction that shows the number of equal parts counted.

Example: $\frac{1}{3}$ ← numerator

O

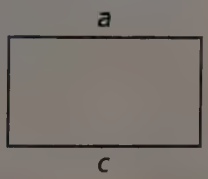
octagon A polygon with eight sides.



odd number A whole number that is not a multiple of 2. The ones digit in an odd number is 1, 3, 5, 7, or 9.

opposite sides Sides of a polygon that are across from each other; they do not meet at a point.

Example: Sides *a* and *c* are opposite.



Order of operations A set of rules that state the order in which the operations in an expression should be done.

STEP 1: Perform operations inside parentheses first.

STEP 2: Multiply and divide from left to right.

STEP 3: Add and subtract from left to right.

ounce (oz) A customary unit used to measure weight.

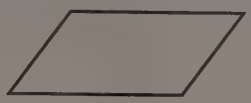
16 ounces = 1 pound

P

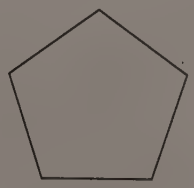
parallel lines Two lines that are the same distance apart.



parallelogram A quadrilateral with both pairs of opposite sides parallel.



pentagon A polygon with five sides.

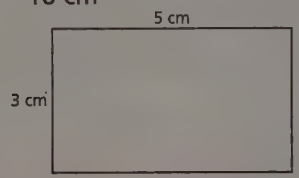


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perimeter The distance around a figure.

Example:

Perimeter = 3 cm + 5 cm + 3 cm + 5 cm = 16 cm



pictograph A graph that uses pictures or symbols to represent data.

Favorite Ice Cream Flavors

Peanut Butter Crunch	2
Cherry Vanilla	3
Chocolate	5

Each stands for 4 votes.

pint (pt) A customary unit used to measure capacity.

1 pint = 2 cups

place value The value assigned to the place that a digit occupies in a number.

9 6 2

hundreds tens ones

place value drawing A drawing that represents a number. Hundreds are represented by boxes, tens by vertical lines, and ones by small circles.

962

P.M. The time period between noon and midnight.

polygon A closed plane figure with sides made up of straight line segments.

pound (lb) A customary unit used to measure weight.

1 pound = 16 ounces

product The answer when you multiply numbers.

Example: $4 \times 7 = 28$

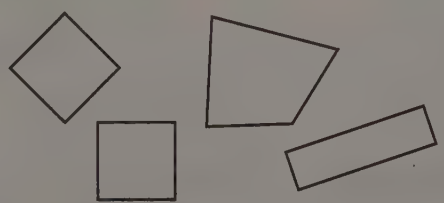
factor factor product

proof drawing A drawing used to show that an answer is correct.

$$\begin{array}{r} 249 \\ +\ 386 \\ \hline 635 \end{array}$$

Q

quadrilateral A polygon with four sides.



quart (qt) A customary unit used to measure capacity.

1 quart = 4 cups

quotient The answer when you divide numbers.

Examples:

$35 \div 7 = 5$

quotient

$7\overline{)35}$ $5 \leftarrow$ quotient

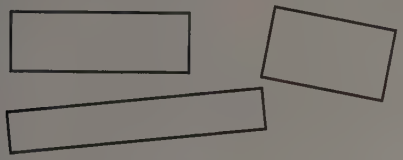
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R

ray A part of a line that has one endpoint and goes on forever in one direction.



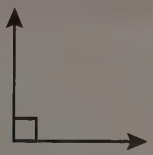
rectangle A parallelogram that has 4 right angles.



rhombus A parallelogram with equal sides.

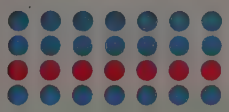


right angle An angle that measures 90°.



round To find about how many or how much by expressing a number to the nearest ten, hundred, thousand, and so on.

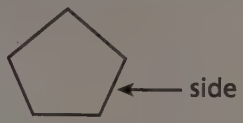
row A part of a table or array that contains items arranged horizontally.



S

scale An arrangement of numbers in order with equal intervals.

side (of a figure) One of the line segments that make up a polygon.



simplify To write an equivalent fraction with a smaller numerator and denominator.

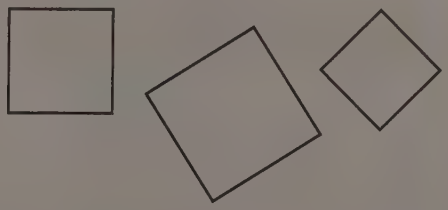
situation equation An equation that shows the action or the relationship in a problem.

Example: $35 + n = 40$

solution equation An equation that shows the operation to perform in order to solve the problem.

Example: $n = 40 - 35$

square A rectangle with four sides of the same length.



square number The product of a whole number and itself.

Example: $4 \times 4 = 16$

square number

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square unit A unit of area equal to the area of a square with one-unit sides.

standard form The name of a number written using digits.

Example: 1,829

subtract To find the difference of two numbers.

Example: $18 - 11 = 7$

subtraction A mathematical operation on two numbers that gives the difference.

Example: $43 - 40 = 3$

sum The answer when adding two or more addends.

Example: $37 + 52 = 89$

addend addend sum

T

table An easy-to-read arrangement of data, usually in rows and columns.

Favorite Team Sport	
Sport	Number of Students
Baseball	35
Soccer	60
Basketball	40

tally marks Short line segments drawn in groups of 5. Each mark, including the slanted mark, stands for 1 unit.



total The answer when adding two or more addends. The sum of two or more numbers.

Example: $672 + 228 = 900$

addend *addend* total *sum*

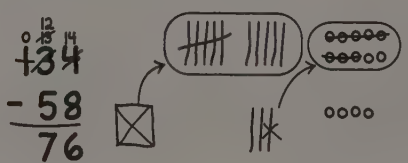
trapezoid A quadrilateral with exactly one pair of parallel sides.



triangle A polygon with three sides.

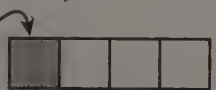
U

ungroup To open up 1 in a given place to make 10 of the next smaller place value in order to subtract.



unit fraction A fraction whose numerator is 1. It shows one equal part of a whole.

Example: $\frac{1}{4}$



unit square A square whose area is 1 square unit.

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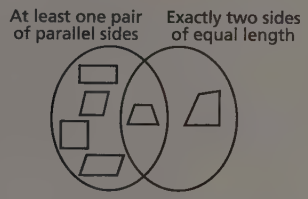
V

variable A letter or symbol used to represent an unknown number in an algebraic expression or equation.

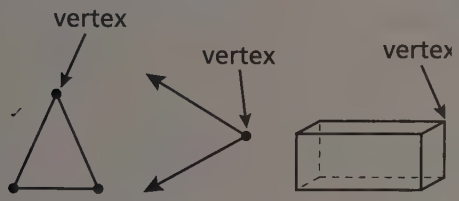
Example: $2 + n$

n is a variable.

Venn diagram A diagram that uses circles to show the relationship among sets of objects.



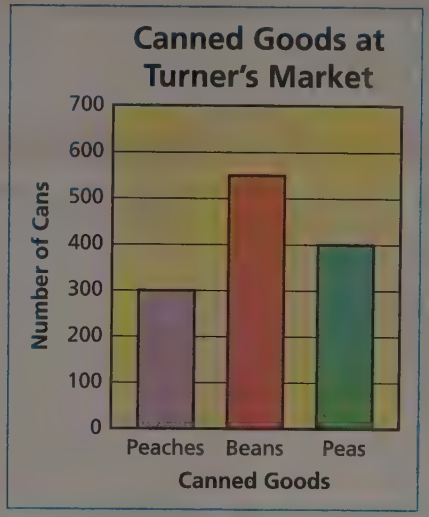
vertex A point where sides, rays, or edges meet.



vertical Extending in two directions, up and down.



vertical bar graph A bar graph with vertical bars.



W

weight The measure of how heavy something is.

word form A name of a number written using words instead of digits.

Example: Nine hundred eighty-four

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Y

yard (yd) A customary unit used to measure length.

1 yard = 3 feet = 36 inches

Z

Zero Property of Multiplication If 0 is multiplied by a number, the product is 0.

Example: $3 \times 0 = 0$

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California Common Core Standards for Mathematical Content

3.OA Operations and Algebraic Thinking

Represent and solve problems involving multiplication and division.

3.OA.1	Interpret products of whole numbers, e.g., interpret 5×7 as the total number of objects in 5 groups of 7 objects each.	Unit 1 Lessons 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 16, 18, 19; Unit 2 Lessons 2, 4, 7, 9, 10, 11, 13, 15
3.OA.2	Interpret whole-number quotients of whole numbers, e.g., interpret $56 \div 8$ as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each.	Unit 1 Lessons 4, 5, 6, 7, 9, 10, 12, 13, 14, 15, 16, 17, 18, 19; Unit 2 Lessons 2, 4, 7, 9, 10, 11, 13, 15
3.OA.3	Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.	Unit 1 Lessons 2, 3, 4, 5, 6, 7, 9, 10, 12, 13, 14, 16, 18, 19; Unit 2 Lessons 2, 4, 7, 9, 10, 11, 13, 15; Unit 3 Lessons 2, 3, 4, 5, 14; Unit 5 Lessons 2, 3, 7, 8, 9, 11
3.OA.4	Determine the unknown whole number in a multiplication or division equation relating three whole numbers.	Unit 1 Lessons 1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 18, 19; Unit 2 Lessons 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15; Unit 5 Lessons 2, 3

Understand properties of multiplication and the relationship between multiplication and division.

3.OA.5	Apply properties of operations as strategies to multiply and divide.	Unit 1 Lessons 3, 6, 11, 12, 14, 15, 19; Unit 2 Lessons 1, 8, 12, 15
3.OA.6	Understand division as an unknown-factor problem.	Unit 1 Lessons 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18; Unit 2 Lessons 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14

Multiply and divide within 100.

3.OA.7	Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.	Unit 1 Lessons 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19; Unit 2 Lessons 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15

Solve problems involving the four operations, and identify and explain patterns in arithmetic.

3.OA.8	Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.	Unit 2 Lessons 9, 10, 11, 13; Unit 3 Lesson 17; Unit 4 Lesson 17; Unit 5 Lessons 7, 8, 9, 10, 11

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3.OA.9	Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations.	Unit 1 Lessons 1, 5, 6, 7, 8, 10, 12, 15, 19; Unit 2 Lessons 1, 3, 5, 6, 8, 14, 15; Unit 4 Lesson 17

3.NBT Number and Operations in Base Ten

Use place value understanding and properties of operations to perform multi-digit arithmetic.

3.NBT.1	Use place value understanding to round whole numbers to the nearest 10 or 100.	Unit 4 Lessons 1, 2, 3, 4, 5, 6, 10, 17, 18; Unit 5 Lesson 4
3.NBT.2	Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.	Unit 3 Lessons 11, 12; Unit 4 Lessons 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18; Unit 5 Lessons 1, 2, 3, 4, 5, 6, 8, 9, 10, 11
3.NBT.3	Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., 9×80, 5×60) using strategies based on place value and properties of operations.	Unit 2 Lesson 12

3.NF Number and Operations–Fractions

Develop understanding of fractions as numbers.

3.NF.1	Understand a fraction $\frac{1}{b}$ as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction $\frac{a}{b}$ as the quantity formed by a parts of size $\frac{1}{b}$.	Unit 7 Lessons 1, 2, 9
3.NF.2	Understand a fraction as a number on the number line; represent fractions on a number line diagram.	Unit 7 Lesson 2, 3, 4, 8
3.NF.2a	Represent a fraction $\frac{1}{b}$ on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size $\frac{1}{b}$ and that the endpoint of the part based at 0 locates the number $\frac{1}{b}$ on the number line.	Unit 7 Lessons 2, 3, 4, 8
3.NF.2b	Represent a fraction $\frac{a}{b}$ on a number line diagram by marking off a lengths $\frac{1}{b}$ from 0. Recognize that the resulting interval has size $\frac{a}{b}$ and that its endpoint locates the number $\frac{1}{b}$ on the number line.	Unit 7 Lessons 2, 3, 4, 8
3.NF.3	Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.	Unit 7 Lessons 4, 5, 6, 7, 8, 9
3.NF.3a	Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.	Unit 7 Lessons 6, 7, 8, 9
3.NF.3b	Recognize and generate simple equivalent fractions, e.g., $\frac{1}{2} = \frac{2}{4}$, $\frac{4}{6} = \frac{2}{3}$. Explain why the fractions are equivalent, e.g., by using a visual fraction model.	Unit 7 Lessons 6, 7, 8, 9
3.NF.3c	Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers.	Unit 7 Lesson 3, 4, 7, 8

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3.NF.3d	Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.	Unit 7 Lessons 4, 5, 8, 9

3.MD Measurement and Data

Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.

3.MD.1	Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.	Unit 3 Lessons 6, 7, 8, 9, 10, 15
3.MD.2	Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem.	Unit 3 Lessons 2, 3, 4, 5

Represent and interpret data.

3.MD.3	Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs.	Unit 3 Lessons 11, 12, 14
3.MD.4	Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters.	Unit 3 Lessons 1, 13, 14, 15

Geometric measurement: understand concepts of area and relate area to multiplication and to addition.

3.MD.5	Recognize area as an attribute of plane figures and understand concepts of area measurement.	Unit 1 Lesson 11; Unit 2 Lesson 2; Unit 6 Lessons 5, 7
3.MD.5a	A square with side length 1 unit, called "a unit square," is said to have "one square unit" of area, and can be used to measure area.	Unit 1 Lesson 11; Unit 2 Lesson 2; Unit 6 Lessons 5, 7
3.MD.5b	A plane figure that can be covered without gaps or overlaps by *n* unit squares is said to have an area of *n* square units.	Unit 1 Lesson 11; Unit 2 Lesson 2; Unit 6 Lessons 5, 7

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3.MD.6	Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).	Unit 1 Lesson 11; Unit 6 Lessons 5, 6, 10
3.MD.7	Relate area to the operations of multiplication and addition.	Unit 1 Lesson 11, 12, 14; Unit 2 Lessons 2, 6, 8; Unit 6 Lessons 5, 6, 7, 8, 9,11
3.MD.7a	Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths.	Unit 1 Lesson 11; Unit 2 Lesson 2; Unit 6 Lessons 5, 6
3.MD.7b	Multiply side lengths to find areas of rectangles with whole number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.	Unit 1 Lessons 11, 12, 14; Unit 2 Lessons 2, 6; Unit 6 Lessons 5, 6, 7, 8, 9
3.MD.7c	Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and $b + c$ is the sum of $a \times b$ and $a \times c$. Use area models to represent the distributive property in mathematical reasoning.	Unit 1 Lessons 11, 12, 14; Unit 6 Lesson 6
3.MD.7d	Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.	Unit 1 Lesson 11; Unit 2 Lessons 2, 6, 8; Unit 6 Lessons 6, 8, 9, 11
Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.		
3.MD.8	Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.	Unit 6 Lessons 5, 6, 7, 9, 11
3.G Geometry		
Reason with shapes and their attributes.		
CC.3.G.1	Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.	Unit 6 Lessons 1, 2, 3, 4, 11
CC.3.G.2	Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole.	Unit 6 Lesson 1; Unit 7 Lessons 1, 2, 9

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California Common Core Standards for Mathematical Practice

MP.1 Make sense of problems and persevere in solving them.

Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, "Does this make sense?" They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.

Unit 1 Lessons 3, 4, 5, 6, 7, 9, 10, 12, 13, 14, 16, 18, 19

Unit 2 Lessons 1, 2, 4, 7, 9, 10, 11, 13, 15

Unit 3 Lessons 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 15

Unit 4 Lessons 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18

Unit 5 Lessons 1, 2, 3, 4, 6, 7, 8, 9, 10, 11

Unit 6 Lessons 6, 9, 11

Unit 7 Lessons 2, 3, 7, 8, 9

MP.2 Reason abstractly and quantitatively.

Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to *decontextualize*—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to *contextualize*, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.

Unit 1 Lessons 1, 2, 3, 5, 6, 7, 8, 10, 11, 12, 19

Unit 2 Lessons 1, 2, 3, 5, 6, 8, 13, 15

Unit 3 Lessons 1, 2, 3, 4, 8, 12, 13, 15

Unit 4 Lessons 1, 2, 5, 6, 9, 11, 12, 13, 14, 15, 16, 17, 18

Unit 5 Lessons 1, 2, 3, 4, 8, 11

Unit 6 Lessons 1, 5, 6, 7, 8, 9, 11

Unit 7 Lessons 1, 2, 3, 4, 5, 6, 7, 8, 9

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MP.3 Construct viable arguments and critique the reasoning of others.

Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. Later, students learn to determine domains to which an argument applies. Students at all grades can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.

Unit 1 Lessons 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 19

Unit 2 Lessons 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 15

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Unit 5 Lessons 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11

Unit 6 Lessons 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11

Unit 7 Lessons 1, 2, 3, 4, 5, 6, 7, 8, 9

MP.4 Model with mathematics.

Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.

Unit 1 Lessons 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 16, 18, 19

Unit 2 Lessons 2, 4, 7, 9, 11, 13, 15

Unit 3 Lessons 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 15

Unit 4 Lessons 3, 4, 7, 8, 9, 10, 11, 12, 14, 17, 18

Unit 5 Lessons 1, 2, 3, 4, 8, 9, 10, 11

Unit 6 Lessons 6, 9, 10, 11

Unit 7 Lessons 3, 8, 9

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MP.5 Use appropriate tools strategically.

Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts.	Unit 1 Lessons 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19 Unit 2 Lessons 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 Unit 3 Lessons 1, 2, 3, 4, 6, 7, 8, 9, 10, 13, 15 Unit 4 Lessons 1, 2, 3, 4, 5, 6, 7, 8, 13, 17, 18 Unit 5 Lessons 1, 2, 3, 4, 11 Unit 6 Lessons 1, 3, 4, 5, 6, 10, 11 Unit 7 Lessons 1, 2, 3, 5, 6, 7, 9

MP.6 Attend to precision.

Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, students give carefully formulated explanations to each other. By the time they reach high school they have learned to examine claims and make explicit use of definitions.	Unit 1 Lessons 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 19 Unit 2 Lessons 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 Unit 3 Lessons 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 Unit 4 Lessons 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18 Unit 5 Lessons 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 Unit 6 Lessons 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 Unit 7 Lessons 1, 2, 3, 4, 5, 6, 7, 8, 9

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MP.7 Look for and make use of structure.

Mathematically proficient students look closely to discern a pattern or structure. Young students, for example, might notice that three and seven more is the same amount as seven and three more, or they may sort a collection of shapes according to how many sides the shapes have. Later, students will see 7×8 equals the well remembered $7 \times 5 + 7 \times 3$, in preparation for learning about the distributive property. In the expression $x^2 + 9x + 14$, older students can see the 14 as 2×7 and the 9 as $2 + 7$. They recognize the significance of an existing line in a geometric figure and can use the strategy of drawing an auxiliary line for solving problems. They also can step back for an overview and shift perspective. They can see complicated things, such as some algebraic expressions, as single objects or as being composed of several objects. For example, they can see $5 - 3(x - y)^2$ as 5 minus a positive number times a square and use that to realize that its value cannot be more than 5 for any real numbers x and y.

Unit 1 Lessons 1, 2, 4, 5, 6, 7, 8, 10, 11, 12, 13, 15, 19
Unit 2 Lessons 1, 3, 5, 6, 14, 15
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Unit 6 Lessons 1, 2, 3, 4, 5, 8, 10, 11
Unit 7 Lessons 1, 2, 3, 6, 9

MP.8 Look for and express regularity in repeated reasoning.

Mathematically proficient students notice if calculations are repeated, and look both for general methods and for shortcuts. Upper elementary students might notice when dividing 25 by 11 that they are repeating the same calculations over and over again, and conclude they have a repeating decimal. By paying attention to the calculation of slope as they repeatedly check whether points are on the line through (1, 2) with slope 3, middle school students might abstract the equation $(y - 2)/(x - 1) = 3$. Noticing the regularity in the way terms cancel when expanding $(x - 1)(x + 1)$, $(x - 1)(x^2 + x + 1)$, and $(x - 1)(x^3 + x^2 + x + 1)$ might lead them to the general formula for the sum of a geometric series. As they work to solve a problem, mathematically proficient students maintain oversight of the process, while attending to the details. They continually evaluate the reasonableness of their intermediate results.

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E

×	4	2	5	1	3	8	10	7	9	6
4	16	8	20	4	12	32	40	28	36	24
1	4	2	5	1	3	8	10	7	9	6
2	8	4	10	2	6	16	20	14	18	12
5	20	10	25	5	15	40	50	35	45	30
3	12	6	15	3	9	24	30	21	27	18
9	36	18	45	9	27	72	90	63	81	54
6	24	12	30	6	18	48	60	42	54	36
10	40	20	50	10	30	80	100	70	90	60
7	28	14	35	7	21	56	70	49	63	42
8	32	16	40	8	24	64	80	56	72	48

F

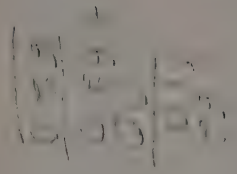
×	9	8	6	7	4	6	8	7	4	9
2	18	16	12	14	8	12	16	14	8	18
3	27	24	18	21	12	18	24	21	12	27
5	45	40	30	35	20	30	40	35	20	45
3	27	24	18	21	12	18	24	21	12	27
5	45	40	30	35	20	30	40	35	20	45
9	81	72	54	63	36	54	72	63	36	81
7	63	56	42	49	28	42	56	49	28	63
6	54	48	36	42	24	36	48	42	24	54
8	72	64	48	56	32	48	64	56	32	72
4	36	32	24	28	16	24	32	28	16	36

G

×	7	6	8	7	8	6	8	7	6	8
5	35	30	40	35	40	30	40	35	30	40
4	28	24	32	28	32	24	32	28	24	32
3	21	18	24	21	24	18	24	21	18	24
2	14	12	16	14	16	12	16	14	12	16
8	56	48	64	56	64	48	64	56	48	64
9	63	54	72	63	72	54	72	63	54	72
7	49	42	56	49	56	42	56	49	42	56
6	42	36	48	42	48	36	48	42	36	48
8	56	48	64	56	64	48	64	56	48	64
6	42	36	48	42	48	36	48	42	36	48

H

×	4	6	7	8	9	6	9	8	7	4
4	16	24	28	32	36	24	36	32	28	16
6	24	36	42	48	54	36	54	48	42	24
7	28	42	49	56	63	42	63	56	49	28
8	32	48	56	64	72	48	72	64	56	32
9	36	54	63	72	81	54	81	72	63	36
8	32	48	56	64	72	48	72	64	56	32
9	36	54	63	72	81	54	81	72	63	36
4	16	24	28	32	36	24	36	32	28	16
7	28	42	49	56	63	42	63	56	49	28
6	24	36	42	48	54	36	54	48	42	24



6|500

$$\begin{array}{r} 62 \\ +\ 10 \\ \hline 72 \end{array}$$

$$\begin{array}{r} 89 \\ -\ 10 \\ \hline 79 \end{array}$$

$$\begin{array}{r} 8 \\ 10\overline{)89} \\ -\ 80 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 14 \\ 10\overline{)143} \\ -\ 10 \\ \hline 043 \\ -\ 40 \\ \hline 3 \end{array}$$

$2+2=4$

$4+2=$

$2*1=2$

$2*2=4$

6

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